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In May

• We could tell you a parable, but we believe that you are more interested in what has actually happened. Imagine anyone lavishly spending money to build and equip factories to produce a perishable food product in large quantity without knowing where there is a market for it. C. C. Street gives us the story of an industry without a market.

• W. F. Robertson knows his fruits and how to process them. He explains the secret of successful use of fresh strawberries in candy making.

• Donald K. Tressler discloses some of the unexpected byproducts of quick-freezing and M. L. Carr reveals the tactics resorted to by women to win their contest with food containers fitted with balky screw caps.

• These are only some of the high spots of what the May issue of FOOD INDUSTRIES will contain. Don't forget that our study on the solar constants of radiation with a revised forecast is to be found on the page of Business Trends.

What to Expect

• Among the subjects to be discussed in the near future only a few are listed below. We have still others which will be helpful to food manufacturers.

"Importance of Quality of Raw Materials"—yes, even in beer manufacture.
"Getting Rid of Excess Moisture in Candy Centers."
"Packing Fresh Fruits."
"Disposing of Factory Wastes."
"Safe Use and Maintenance of Refrigerating Apparatus."
"Saving $6,000 a Year in a Flour Mill."
"Improved Method for Preparing Maraschino Type Cherries."
"Milk Sugar."
"Belted Motor Drives."
"Fumigation of Foodstuffs."
"Production Economies."

THE EDITORS.

FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

LAURENCE V. BURTON, *Editor*
M. A. WILLIAMSON, *Publishing Director*

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CANDY

FOR YOUR GIRL

OR CREAM

FOR YOUR COFFEE

★

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FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

Volume 5.....Established 1928—McGraw-Hill Publishing Company, Inc.....Number 4

NEW YORK, APRIL, 1933

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Laurence V. Burton, Editor

Save Us From This!

AS LONG as the new administration is bent on making tax collectors of many of the food-processing industries of the country and is determined that willy-nilly these industries must get much more money for their goods than they have been able to realize for years, it is not surprising that many of them are very much on the defensive.

● ANY sales manager worthy of the name knows the pulse of his markets and is only too willing to up his selling prices at the slightest justification. Yet the latest version of the farm relief plan says in effect to every food manufacturing concern in the affected groups: "You are not getting enough for your foods. You must charge the prices of the good old pre-war days."

● AND management, knowing its markets far better than any legislator or self-appointed champion of the farmer, knows how utterly impossible it will be to sell all the volume at the predicated price.

● IF THE government *legislates a required mark-up* of prices to pre-war level, it will not only be a futile gesture but an actual economic boomerang that will injure the very group it is designed to help. And all this criticism is quite apart from the economic damage that will be done to the food-processing industries or the great injustices wrought on large sections of the population.

● THE FOOD industries oppose this bill because they see in it only trouble and ruin for themselves, and all to no good purpose. Tonnage moves only at the market.

● DESPITE chaotic economic conditions of the day, despite the need for higher prices for all commodities, despite the complete unbalance that exists today between urban and agricultural purchasing power, we are unalterably opposed to any social-economic experimentation on a national scale in a direction that is foredoomed to failure. The "noble experiment" of late and lamented memory is as child's play compared to the malevolent forces that will be brought into action by this proposed blunder.

● ONLY ONE feature of the plan deserves praise for its practicability—the acreage leasing plan—but when the funds to carry out the leases are to be derived from a processing tax, right there it, too, becomes worthless. If a tax is necessary to raise the appropriation, only a general sales tax—not a special sales tax on a few foods—will do the job successfully or equitably.

● IN DEALING with a subject so vast and so fraught with revolutionary social implications, we pray that Congress will refuse to be coerced into hasty decisions. Agriculture needs and deserves help, but not at the cost of national ruin.

...AS IT LOOKS TO US

Fussy

"The Commission went too far to order what amounts to a suppression of trade names." Thus the U. S. Supreme Court tells the Federal Trade Commission that it was too fussy in forbidding the use of the word "milling" as a part of a trade name when a company was willing to qualify that name so that no public deception would follow. All food manufacturers can well adopt the court's sound reasoning, which says in effect: Don't fool the public, but develop trade names effectively.

•

Increasing Purity

Raw sugar entering the United States seems to be getting purer every year, according to a tabulation made by the Laboratory of the New York Sugar Trade. In 1923, the average polarization was 95.98 per cent. In the following ten years, the average has climbed almost steadily to 96.80. Philippine raws have fallen off fractionally, while Puerto Rico raws have climbed from 96.29 to 96.77 in the last five years. Cubans have declined fractionally for the last four years. In the sugars classified as "all others" the big improvement is found, with a five-year rise from 96.07 to 97.48 per cent.

•

The Honeymoon Begins

Now that the constitutional obstacles have been removed, the brewing industry will be afforded a chance to show how much it has retained of its ancient art. From the joyous rush to order supplies and equipment one may surmise that popular estimate of the reviving industry is one of roseate optimism. But how long, pray, will the public pay money for some of the terrible decoctions that have recently passed for beer?

The previous legal need to dealcoholize has led many a concern into careless ways, for why strive to create the perfect flavor if it must ultimately be destroyed by boiling? Between the flavor of the best commercial bootleg and a really fine beer such as Löwenbräu (Münchner) there is an amazingly wide gap—a gap that finds an equivalent in the difference between a low-grade country butter and 92-score; in the difference between substandard and fancy quality canned foods; in the difference between heat-sterilized and freshly expressed Valencia orange juice.

After the honeymoon period of a few months, the real struggle for the market will begin. There will be technical headaches, aplenty. The race will not necessarily be won by the volume producers. Nor can it be won by quality alone without due regard to costs. Yet there is the inescapable fact that the beer-drinking sector has been educated for thirteen years to the two-bit stein in a "speakie." The insulated tank car, the decentralized bottling unit and the mechanical refrigerator cabinet are economic factors that loom huge on the horizon.

Our best advice to our readers in the cereal beverage group is that they keep their wits about them during the honeymoon; that they continue the study of technical and mechanical advances made in allied branches of the food field where problems affecting taste, color and keeping qualities have been met and solved.

And to those who fear the worst from competition from beer we urge that they also keep a clear head. Many a concern has been nearly wrecked by incorrect appraisal of the delirious events of a commercial honeymoon.

•

Raw Materials

Selection of raw materials is as essential to the production of food as is modern sanitary equipment or technically controlled operations. In your zeal to lower costs or to obtain a profit, remember that, after all, the finished product is intended for human consumption and that profits are more likely to result from repeat orders and lowered sales resistance than from cheaper raw materials.

Modern equipment and controlled process operations help keep good food good. Likewise they help keep low-quality food from becoming worse. But, since profits can result only when sales are made, it behooves the food manufacturer to use materials which will not only keep his production costs to the minimum but also give his product that quality which encourages repeat orders and lowered sales resistance. Raw materials purchased on price basis alone often prove to be more expensive than those of higher quality selling at higher prices.

Milk Strikes

Six months ago it was increasingly evident that the 1933 national cow population would be about 3 per cent larger than in 1932; that the flow of milk would be from 2 to 4 per cent larger as a result. In Cleveland it then looked like a 25 per cent increase for this year. A Chicago manufacturer told us last October he expected 20 murders to occur in that territory in 1933 as a direct result of competition for an outlet for the flood of milk. The prediction we believe is slightly an understatement. Yet there is no law that compels men to do the wrong thing—nothing except selfishness, distrust, and lack of foresight.

•

Credit

Any firm or individual should consider carefully the consequences of ruining his future credit by evading his just obligations other than by mutual postponement.

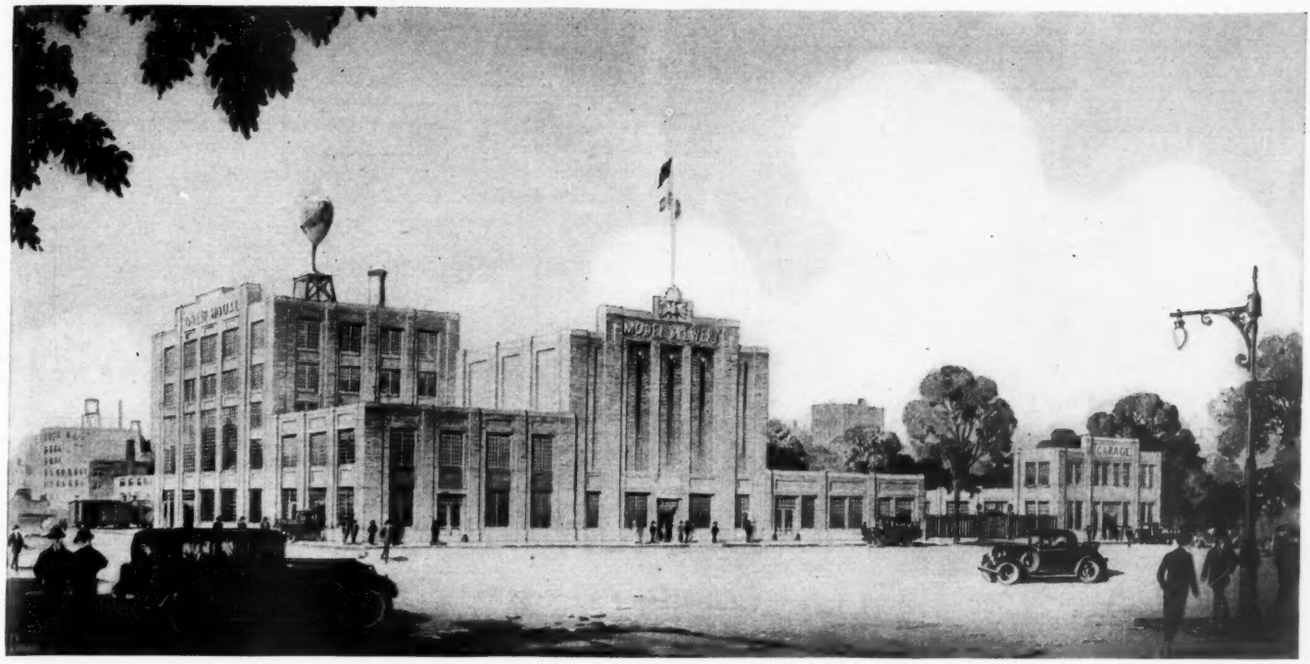
•

Bacteriologist Needed

Holes in bread are not new, nor are many of their "cures." However, at a recent meeting of the Holes-in-Bread Club of New York City a lengthy committee report revealed that there is a type of hole that does not respond to the well-known "remedies" and is a menace to the baking industry.

It is likely to disappear as suddenly and as inexplicably as it came; not wholly unlike that of an epidemic of disease. It has been known to baffle control and research chemists, experienced production men and versatile "trouble shooters," only to be eliminated by such practical acts as cleaning out the ingredient water tank or the addition of a solution of germicidal acid such as vinegar to the dough batch.

Such occurrences do not "just happen." There is a logical and a reproducible cause for this type of hole if the proper effort is made to identify this cause. Problems not greatly different have been solved in other industries less biologic in character than the baking industry by the fundamentally trained bacteriologist. He is a valuable man to know, and the baking industry could well profit by having him at work on some of its problems.



What the Brewery of the Future Will Look Like

By VICTOR BUHR
Vice-President,
Equity Construction Co.
New York, N. Y.

When this industrial Rip Van Winkle reawakens, after thirteen years of sleep, what sort of a place of business will he have?

RAPID strides have been made by the food industries during the past thirteen years through the adoption of modern production methods. Most of the important development has taken place during the long period of inactivity of the brewing industry, during which new methods, new forms of production-control apparatus, new types of equipment, new refrigeration machinery have been brought into existence by manufacturers supplying all lines of the food industries.

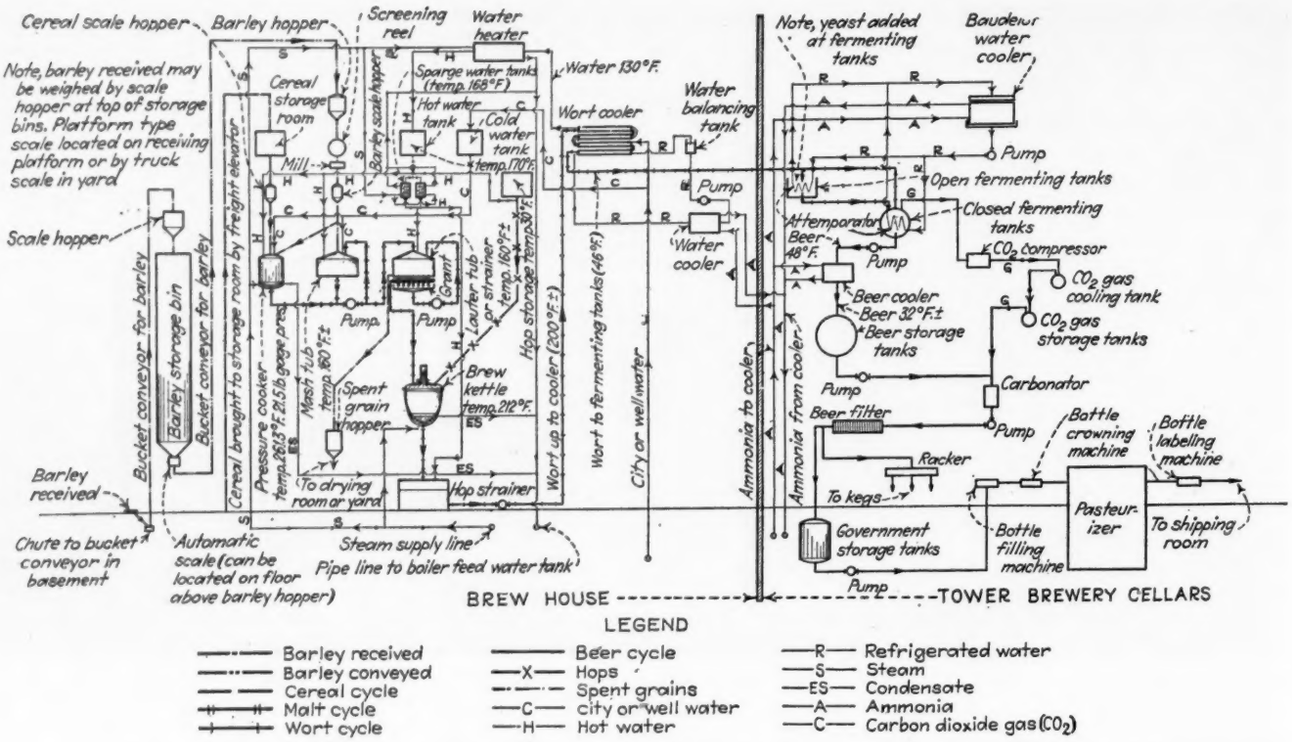
With all this newer equipment to draw upon it is obvious that the brewery of the future will not be an exact replica of the brewery of the past. It is natural to expect that the improved equipment of today will find its place in the rehabilitation of this tremendous industry. By analogy to other industries the brewer who confines himself to the manufacture of a quality product utilizing the most economical methods and equipment will be the successful brewer under the new régime. But what will the new brewery look like when it is constructed in accordance with the best practice of today?

In anticipation of modification of the 18th Amendment which will permit the manufacture and sale of real beer, the writer made an extensive study of the brewing industry as it existed prior to prohibition, and then spent considerable time abroad to gain recent first-hand knowledge of processes employed today. This was done for the purpose of determining how and to what extent the best European practice applies to the brewing industry that will develop in the United States.

It is not the writer's intention to pass judgment or suggest methods of brewing or merchandising. These subjects have been studied only to the extent of qualifying as engineering advisers to brewers and brew masters in translating their own ideas and experience into a practical layout that will insure the efficient operation of equipment. Brewers have always stressed quality, and this, of course, is the prime consideration. Due to economic conditions, however, more thought will have to be given to cost of production, and in this capacity the services of a well-trained engineer, versed in modern food-production methods, will prove desirable.

Unfortunately, much misinformation is going the rounds today regarding the profit-making possibilities of this industry and entirely too many people are led to believe that beer is a sort of industrial Moses that will somehow be a cure-all for all their difficulties. Unscrupulous promoters and brokers are circularizing the public, in some cases quoting profits to be made per barrel that exceed the entire cost and profit per barrel, without including taxes. Money is sought by an exchange of stock for equipment and buildings, and all the tricks of the trade of the "Florida real estate operator" and the speculative builder have been employed to obtain financing. Some of these projects no doubt will be brought to an actual realization and money will then be a drug on the market.

From a manufacturing standpoint, brewing is the converting of grain. It is a complex business—just as involved and extensive as the milk or baking business, and presenting parallel problems of purchase of raw materials, production and merchandising. It may be



Flowsheet

Here is the flow diagram of a modern brewery cycle, utilizing the newest equipment available, and based on 100,000 bbl. per year. By judicious use of pumps the building height has been reduced by one or two stories, thus eliminating some of the everlasting running up and down circular stairways that featured the days of old. Note that most of the equipment is familiarly used for material handling, cooking, sifting, filtering, cooling.

expected that the experienced brewer, fortified with knowledge, established good will and facilities, will give a pretty good account of himself in meeting the demand for his product. Especially will this be true of the individual or firm that is cognizant of the economic trend so prevalent in today's business and makes use of low-cost production methods through the medium of modern machinery and layout. This does not infer any radical departure from the process or any magic trick of aging, of which much is heard.

The wholesome effect of aging on the quality of beer is beyond question, average experience requiring about three months, yet much is heard of new processes that will cut this period down to 8 days or even 24 hours. It may be possible in "bootleg" beer, or for anyone considering only the sale of "slops," but for really good beer a sufficient period of aging is indispensable. This was the subject of much investigation by the writer while in Europe, particularly in Germany, where, due to economic conditions in late years, every advantage has been utilized in attempting to cut costs. The German brewer would rather throw his beer away than jeopardize the quality through any attempts at quick aging. At the seventeen brewery establishments visited, the policy in this respect was universal and is confirmed by the best minds in the brewing industry in the United States.

Other possibilities of improvement in process or savings in manufacture were considered and the conclusion reached is that the biggest opportunities present themselves in refinement of plant layout and use of modern auxiliary machinery rather than in short cuts in the process. Take, for instance, the development of refrigerating machinery, air-conditioning and electrical appurtenances. Years ago the brewing industry was instrumental in providing a field for the development of mechanical refrigeration, and industry generally is indebted to the brewers for the part they took in pioneering the commercial use of mechanical refrigeration. Comparing today's machines with those in use fifteen years ago, one finds much greater tonnage capacities available in smaller units and, through application of synchronous motors, great savings can be effected in power consumption costs. Similar examples of other improvements in machines can be cited, and in building construction more improved types of materials and methods are available.

Brewing as a business provides tremendous opportunities for new business, but it should not be considered by anyone not fully cognizant of the responsibility involved. A brewery represents a large initial investment. Buildings and equipment must be of substantial construction, and only the best of materials, insuring strength, durability and sanitation, can properly be utilized. In selecting a site or in contemplating the conversion of a building into a brewery, the following must be given serious consideration:

1. Desirability of location as to distribution and receipt of raw materials. A railroad siding will prove very beneficial. Zoning restrictions should be carefully investigated before any plant or property is purchased.

2. Availability of cold artesian well water for cooling and washing-down purposes. The services of a reliable chemist should be obtained in making tests of the water that is intended for ingredient purposes. The quality of the water used in make-up of brew has considerable influence on the finished product.

3. Building should be of fireproof construction, with heavy floor-load capacities, high ceilings in principal rooms, waterproof floors and smooth walls. If the purchase of existing buildings is contemplated, an inspection of the premises by an engineer familiar with the brewing process is most desirable.

A representative installation, predicated on the vital manufacturing factors, with consideration given to probable methods of merchandising and distribution, and embodying all requisites for the manufacture of a quality product, has been designed to illustrate what the modern brewing establishment will look like. It is planned with a capacity appropriate for an average size city. The cycle of operation is more or less typical. Capacity is adjusted by size of equipment and number of daily brews processed. The design stresses the all-important feature of economy in

production at any anticipated volume, with consideration of fluctuation in volume due to seasonal and other influences.

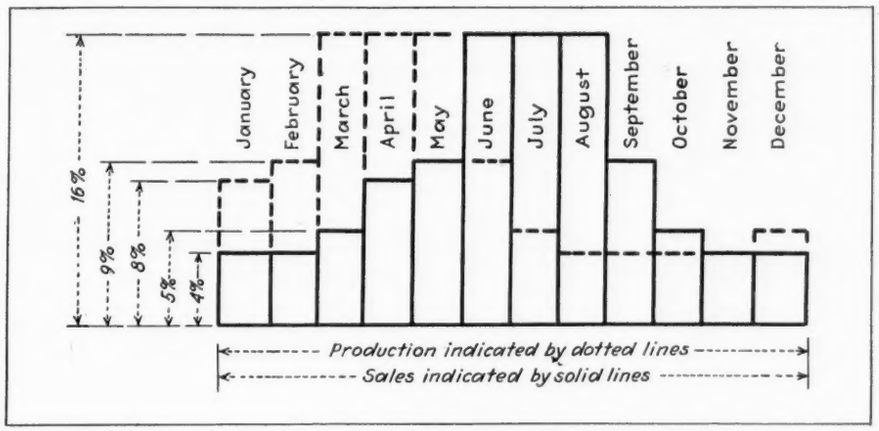
As in everything else, much difference of opinion exists between our brew masters as to the desirability of one method or another. These differences are mostly of a minor character, however, and it can safely be said that the cycle of operation herewith presented is the one most universally in use in this country. If comparisons are made with the European practice, they should take into account such factors as the barley used there is processed in the plant, whereas here brewers buy the barley malt already prepared. Then, too, just as we indulge in iced drinks, our beer was always more highly carbonated than the foreign beer, which likewise contains more solids than ours and is made almost entirely of malt. Our beer contains cereal, either corn or rice, which is not generally the case with foreign beer. Factors such as these must be taken into account when accepting the recommendations of foreign experts or brew masters. Due allowance has been made in the accompanying layout for such factors, and flexibility is provided to permit the manufacture of different grades of domestic beer with the same equipment and substantially the same process.

It is important that ample facilities be provided for storage of beer in aging tanks or "lager keller," for sales must be anticipated in the manufacturing process several months ahead (see manufacturing chart). While it is true that the scale of production will fluctuate, it is desirable to have a layout that will, in so far as is possible, provide an even volume of production, thereby utilizing to the utmost all manufacturing equipment and plant personnel.

The brew-house process will require from seven to eight hours per brew. The capacity of equipment should be designed for a single brew sufficient to meet the sales demand during average months. Manufacturing for peak summer months, which takes place from March 1 to June 1, can be accomplished by means of an extra daily brew during this period. All manufacturing capacities calculated should be on the basis of a five-day week. While a gravity-flow system is preferable, no objection exists to a modified gravity system such as that illustrated, which employs pumps at two locations, thereby cutting down substantially the height of building and attendant extra cost of construction that would be entailed in a strictly gravity system. A modified gravity system eliminates labor, in that fewer levels are required and the equipment can be operated more conveniently by the attendant.

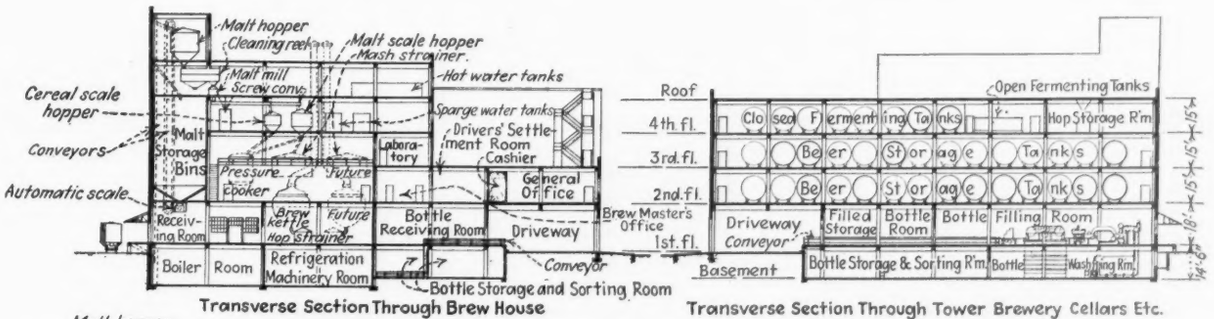
In designing and constructing, or in remodeling, a brewery, the following should be carefully considered:

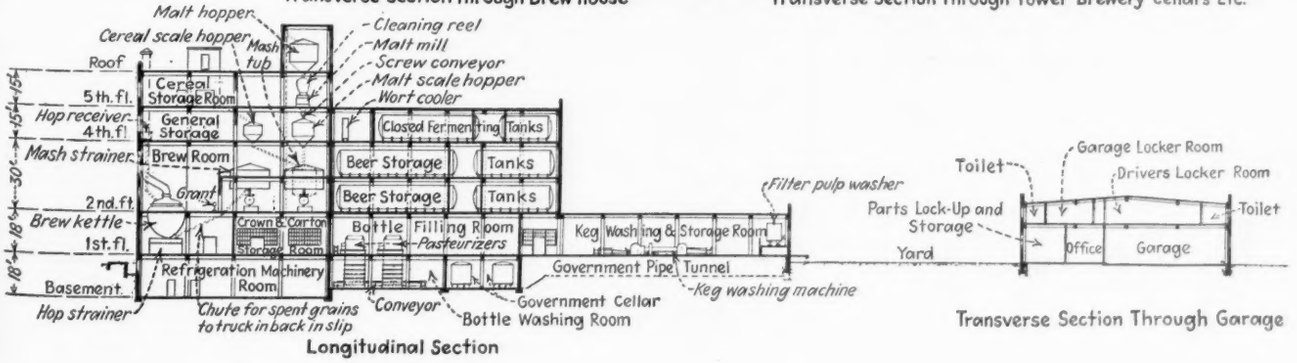
1. Complete plans showing in detail all work, and especially the location of beer lines, should be filed with the local representative of the Department of Internal Revenue and their approval obtained before any work of construction is commenced. This in addition to whatever regulations may apply as to approval of municipal or state building, fire and labor departments. The law as formerly enforced compelled the location of bottling house and government storage cellar in a separate building.

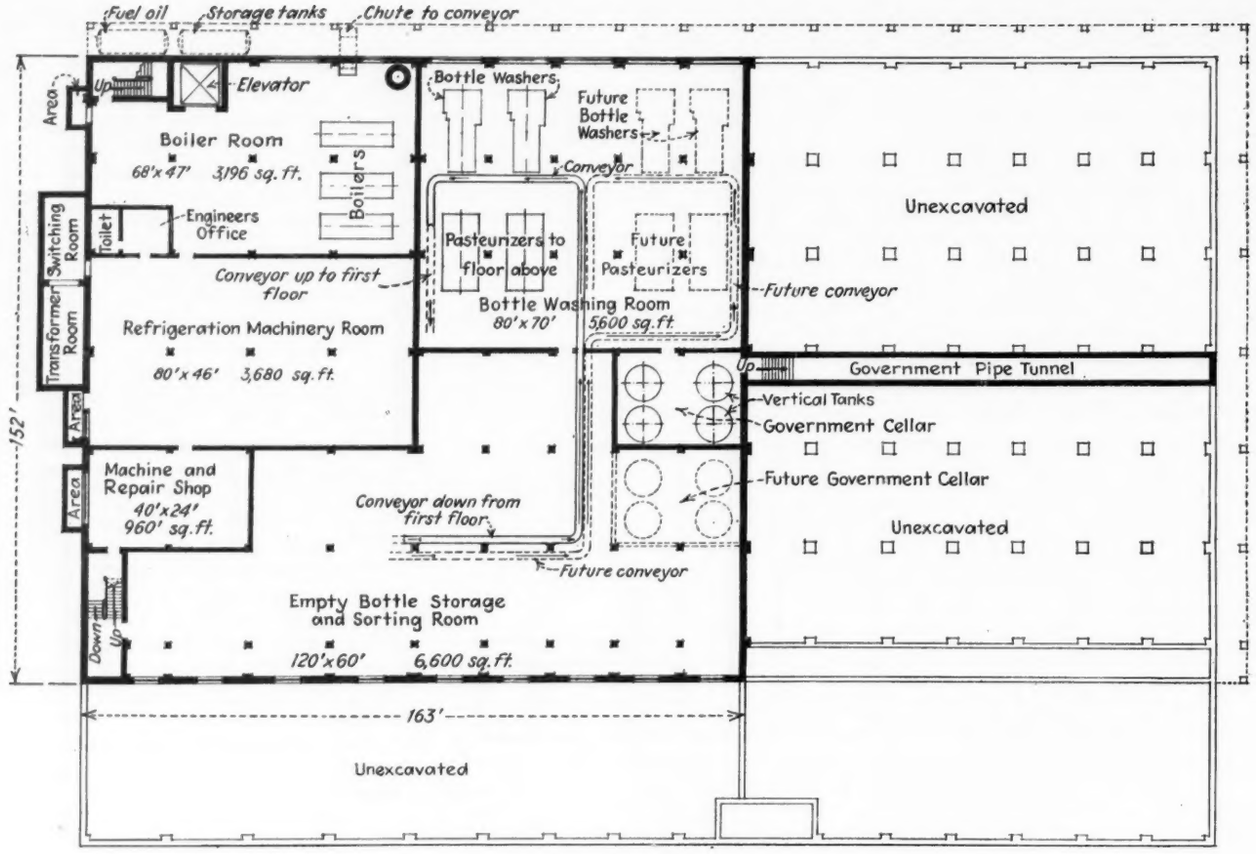


Production Chart

In order to sell beer that is always properly aged it is necessary to produce an adequate volume in anticipation of peak demand. This in turn determines the size of storage capacity required. The common-sense basis for economical production control is indicated by this chart.



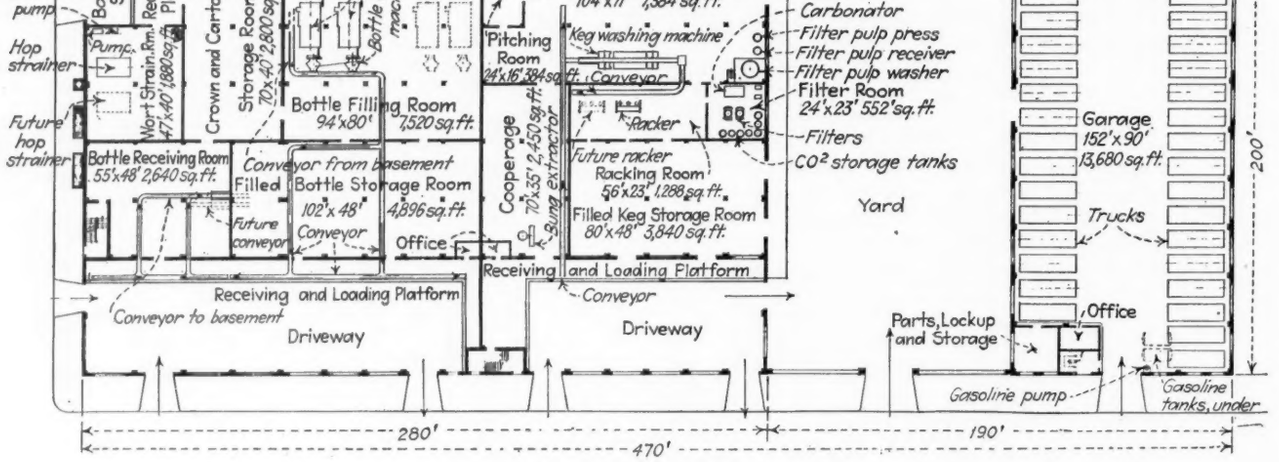




Basement Plan

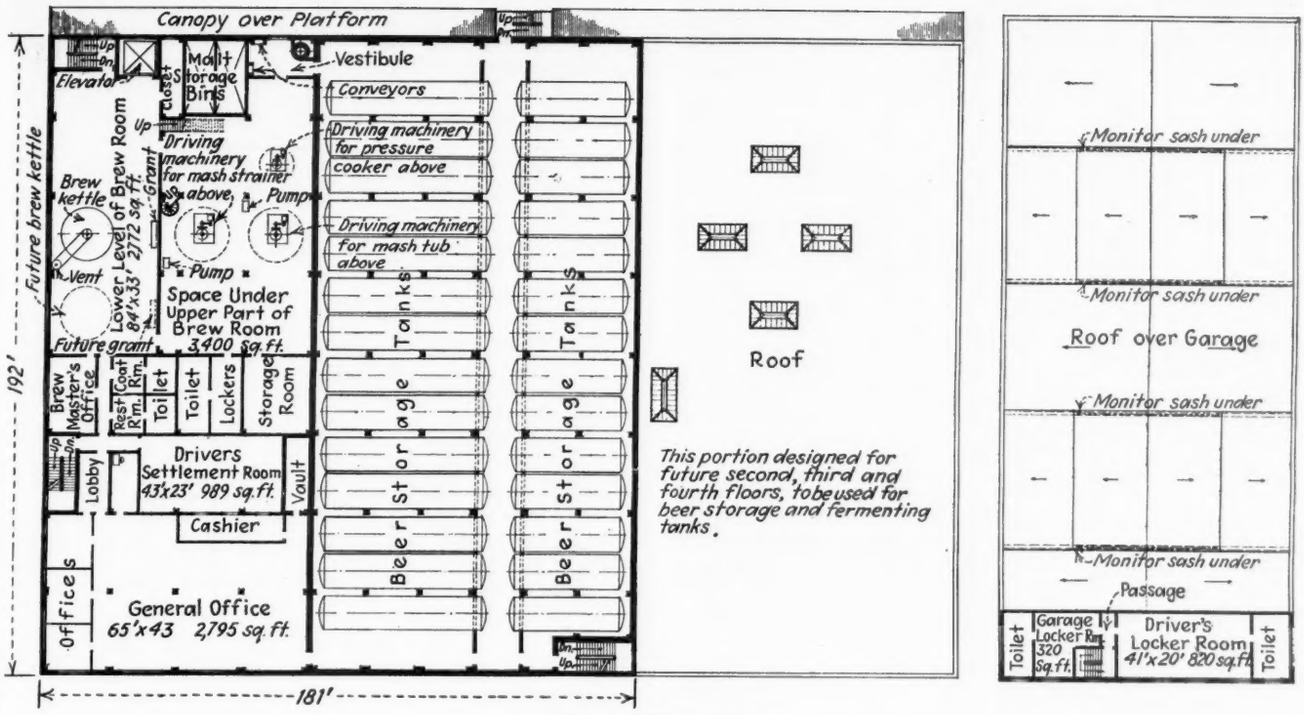
The whole procedure of handling and washing bottles will be a duplication of that unit operation in modern dairies.

This was due to the fact that the tax on bottled beer was paid directly to a government inspector at the brewery, and beer for bottling could not be withdrawn from government storage tanks without his approval. On kegs of beer a stamp was affixed. It seems highly probable that under a resumption of activities a stamp will be required on each bottle. Such a system would facilitate matters for the federal government in supervising the sale of legitimate beer. The objection to this method is that a stamp might become dislodged through the bottle being subjected to moist sur-



Ground Floor Plan

In many respects this floor is much like a modern dairy. That solid partition between the key and bottling departments is not an accident; it is required under the existing law.



Second Floor Plan

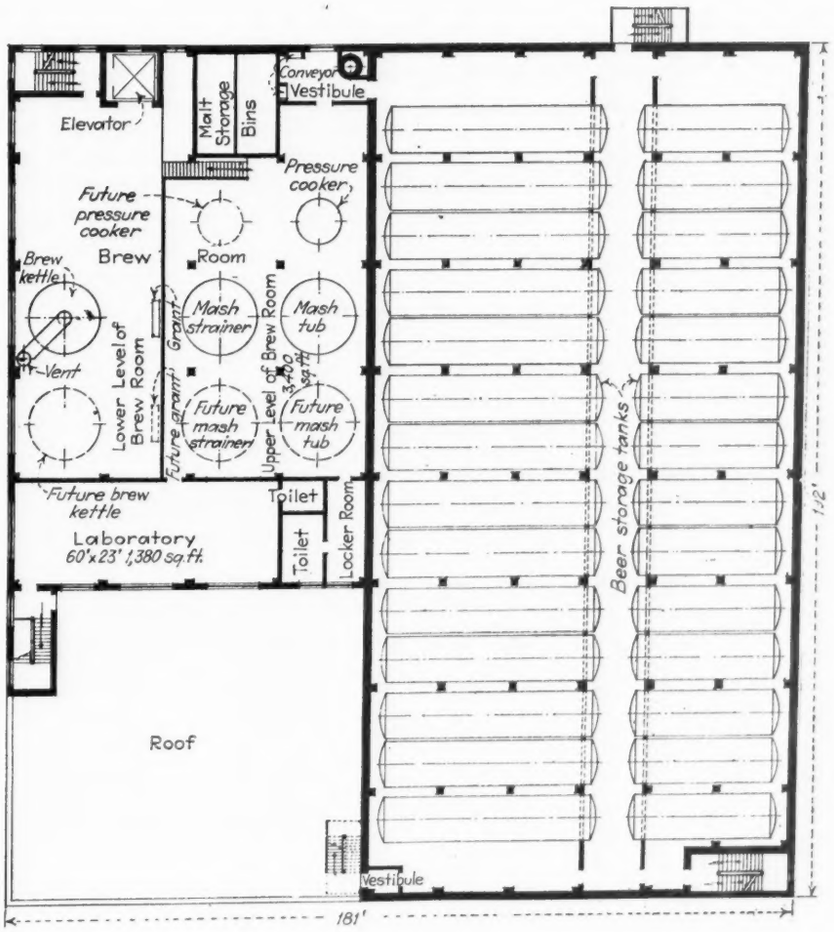
The important feature of this floor is the arrangement of the storage tanks in separate insulated rooms with only their ends projecting into the passageway. This idea will save refrigeration when operations are slow, through using only one section instead of all.

roundings. It seems reasonable to suppose that some up-to-date stamping device will be adopted for this purpose and thereby permit the simplification of layout. While the accompanying layout presupposes such a modification of requirements, this detail should be carefully investigated before proceeding.

2. Another factor having considerable bearing on production layout will resolve itself in the percentage of beer to be sold on draught or in bottles. The solution to this problem depends, of course, on the type of sales outlets allowed by law. Consequently, definite estimates of such proportions cannot be made at this time and plans now made should provide flexibility in alloting space for beer racking and bottling departments.

3. Due to recent developments in mechanical refrigeration, it seems reasonable to suppose that sales outlets will be equipped with such apparatus, thereby eliminating the use of ice. Hence it does not seem desirable to give consideration to an ice plant in conjunction with a brewery.

4. Air-conditioning will find an important place in the brewery of the future. For instance, fermenting rooms, aging cellars, yeast culture room, hop



Third Floor Plan

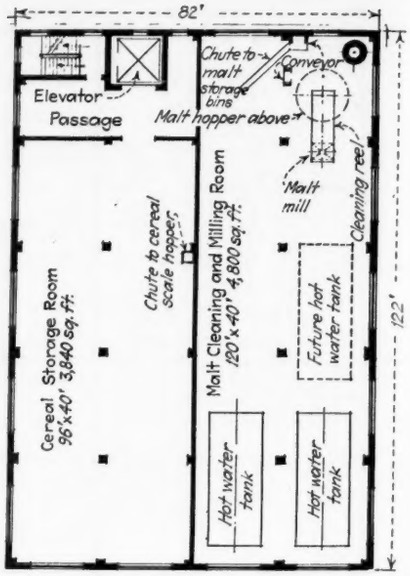
Provision is made for expanding productive operations in the future. Although there is another large storage room on this floor, any further expansion of the capacity for peak load production will require ultimate extension of the second floor storage room. Equipment makers will be interested in the huge number of storage tanks.

storage and office space should be provided with such facilities. Formerly the fermentation rooms were provided with cooling coils and in some cases ventilating ducts. The use of modern air-conditioning equipment in such spaces will provide positive temperatures and humidity, and eliminate such objectionable features as condensation. At the same time it will assist in maintaining quality through the uniformity of room conditions. Then, too, there is the office, which formerly was generally located in a separate building on account of the noise and odors in the plant proper. These objectionable features can be corrected through the use of air conditioning, placing the quarters for management in the most convenient location accessible to all departments, and assisting materially in effecting plant control, and eliminating thereby the expense of such quarters in a separate building.

5. Most brewers formerly generated their own power. Except in the case of the very large establishment, this does not seem advisable, for a contract with a local public utility company and modern electrical equipment within the plant properly installed will produce costs in line with those possible under individual plant operation. A considerable saving can thus be effected in original capital outlay for plant and costs of maintenance. A separate building formerly housed the power and refrigerating units. The refinement of machine design and inadvisability of generating one's own current makes it practicable to house these services in the plant proper and, when located in proximity to equipment and spaces served, makes for efficiency in cutting down runs of piping and the like.

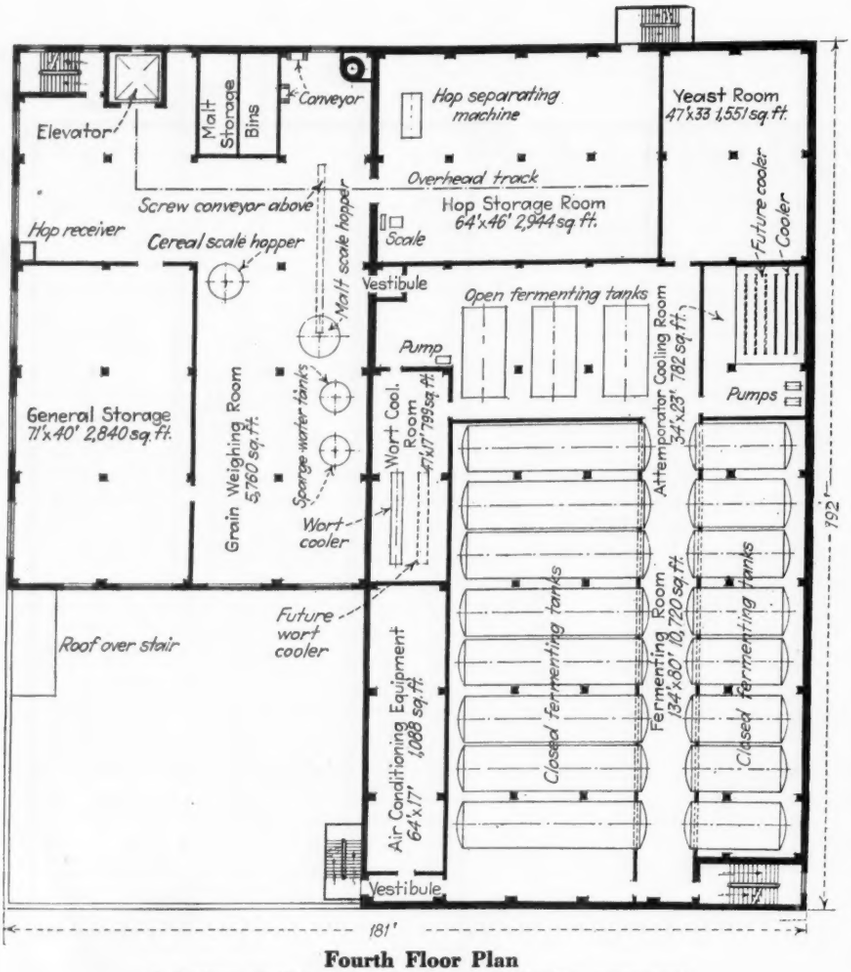
6. A system of regenerative cooling that has proved very satisfactory in milk-plant operation might well be adopted in brew-house design. A heat exchanger is installed through which the hot wort from the brew kettle flows and will heat the cold-water supply to the hot-water tank, which in turn will accomplish substantial cooling of the wort. This function, while not sufficient in itself to complete heating of the water or cooling of the wort, serves materially in reducing energy consumed for this purpose and should effect a considerable saving in production costs.

7. Where a railroad siding is available a silo will prove useful for storage of barley. Conveying devices can be arranged for automatically transferring this grain to a hopper in the brew house in required quantities per batch. Conveyors in general were formerly used in breweries and are in considerable use in cereal beverage plants today. Probably shipping of bottled goods in cartons instead of cases should be considered, however, in the design and selection of conveyor equipment. Cereal storage should be in a separate space, either in a room or a hopper on the top floor. This is because of the fact that the particles will congeal when placed in bulk in a silo of any considerable height. The space for this storage also should be insulated.



Fifth Floor Plan

Insulation of the cereal storage room and of the entire roof is essential.



Fourth Floor Plan

A feature of this floor is the air-conditioning equipment, something not used in the older days.

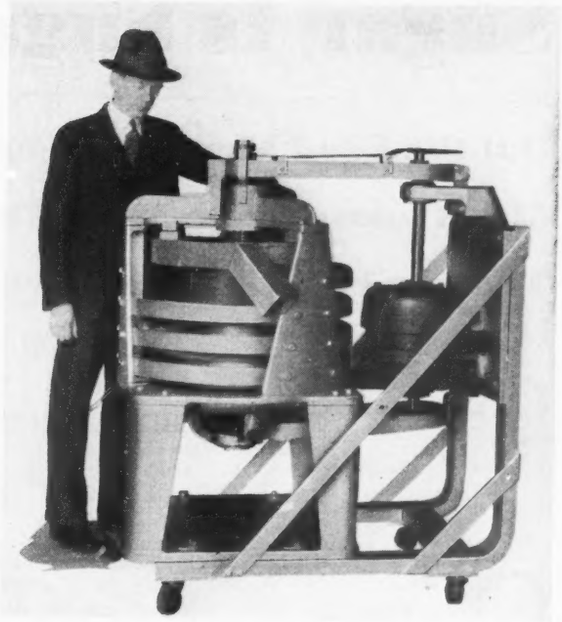
8. The building itself should be fireproof, made of brick with structural steel frame and concrete slabs with suitable floor finishes laid over waterproofing. An abundance of floor drains properly spaced with relation to equipment should be provided. Wall finishes should be durable and, in the principal rooms of the brew house, enamel brick will prove advantageous. Pockets and dirt-catching corners should be avoided, as the elimination of bacterial development on the premises is essential. Adequate sized ducts, carrying off fumes and vapor from the principal equipment, should extend well above the roof line. The entire roof should be insulated.

Above all, every requisite for absolute sanitation of manufacturing space should be incorporated.

An inspection of the accompanying plans will reveal a coordinated layout with departments planned in accordance with the fundamental principles outlined above, effecting an integrated unit making for simplicity of operations and assuring low production costs at a minimum capital outlay for plant and equipment.

Concentrating Liquids By Freezing in a Continuous Process

By KARL L. FORD
Glass Container Association
New York, N. Y.



One would never guess what this machine can do from its appearance. If a fruit juice or a coffee solution is fed into it, the water is removed as a sort of snow and falls from the chute on the side, while the concentrated material flows out at the bottom into a suitable receptacle.

AMONG the many unusual new developments of the application of refrigeration is the concentration of liquid by a continuous process. The inception of the development work resulting in this process dates back to 1921 in the attempts to concentrate a liquid coffee. At that time, W. A. Zorn, experimenting with various methods of concentration, found that the use of heat proved impractical, owing to the loss of flavor, and turned to refrigeration. His earlier experiments were carried out with every known method of accomplishing this process, but all were too expensive to become practical.

The first attempts were to freeze in an ice-cream freezer and then transfer the frozen mass to a centrifuge, where the concentrate was whirled free of the ice crystals. This method did not give the required degree of concentration, and it was necessary to repeat the entire operation. Various means of freezing, with agitation of the mass to produce small crystals, differed somewhat in the amount of entrainment of the concentrate. Another method was to freeze in cakes and then crush the cakes and transfer to a centrifuge. This method was not given any attention, as the impracticability for the purpose was recognized.

Since concentration by refrigeration instead of by heat has merit not only for coffee extract, with its delicate aromas which are easily lost, but for other products, such as fruit juices and many extracts, it is evident that any development toward the improvement of this method of concentration will have a wide field of application. Therefore, much time and expense has been devoted to this problem, the solution of which not only produces an improved commercial coffee extract but affords a means of duplicating this improvement in other fields.

Ample evidence of the remarkable retention of flavors of food products preserved by refrigeration is available. Various investigators have cited the advantages of refrigeration for the concentration of fruit juices. There is no doubt that refrigeration prevents the loss of volatile materials which are not retained during concentration by heat under vacuum, despite the reduced temperature.

Engineering difficulties involved in concentration by freezing out the water have prevented any rapid development in this field. Some effort has been made to obtain freezing apparatus which would produce small crystals and thus prevent entrainment of the concentrate so that it could be completely removed from the ice crystals during centrifuging.

Generally one freezing is not sufficient to produce the desired concentration, and the entire procedure must be repeated. A batch freezer employing mechanical agitation, such as is used for ice cream, produces a mushy ice, easily handled, and a concentrate easily freed in the centrifuge. But in every instance it was necessary to refreeze and separate a second time to obtain a high concentration.

One variation of this procedure is to let the mass stand and allow the concentrate to drain from the ice crystals. Another method is to freeze on the metal surface of a pipe or drum and scrape off the frozen mass separating the concentrate by centrifuging.

The ideal method would be to combine the two steps—freezing and separation—in one unit, which would make it a continuous operation. Such a piece of equipment would not only eliminate batch operation but would afford exact control of the degree of concentration. For fruit juices or other products which must be handled rapidly, a quick-freezing continuous method would have many advantages.

Very recently there has appeared, as the work of W. A. Zorn and his associates, a unit for concentration by refrigeration which gives promise of filling the need for a practical commercial continuous concentrator employing refrigeration instead of heat. The principle of operation is simple yet it appears to take into account many factors which are important in concentration by refrigeration. By an ingenious arrangement of the operation, the dilute liquid entering the machine is quickly exposed to the freezing medium and separation of the ice crystals to increase the concentration is continuous. This permits continual exposure of a fresh surface of the entering liquid to freezing conditions.

To decrease the extent of the chilling required in the concentrator, the entering liquid is precooled. Furthermore, it can be subjected to a vacuum, if desired, to remove air.

Formation of ice crystals on the surface of the liquid is accomplished by forcing a refrigerated gas against the surface, or the gas can be recirculated in a closed system. It is possible to use an inert gas which will be relatively free of oxygen, if it is essential to prevent oxidation of the food product during the short period of exposure.

One essential characteristic of the liquid to be concentrated is a density sufficient to float the ice and an increase in density as the concentration increases. Obviously certain products, in which a separation of ingredients may occur in the centrifuge that will prevent freezing on the surface, cannot be handled in such a unit.

The possibilities of this machine are not limited to concentration by refrigeration. Experiments indicate that it is possible to adapt the same principle to low-temperature moisture removal without recourse to low-temperature refrigeration.

Sugar Is Sugar

But the Food Manufacturer May Choose From More Than Thirty-Six Grades of Sucrose

By **WHITMAN RICE**
Chemist, National Sugar Refining Co. of New Jersey
New York, N. Y.

CONTACT with manufacturers using sugar has brought many surprises because of lack of information about the various grades produced and their specific uses. The probable explanation is that there is no way to gain this information readily, as it has never, so far as the author knows, been given any general circulation.

The attached chart enumerates 36 grades of sucrose to which may be added many more grades made specifically for use with a particular equipment. Every one of these sugars has been produced at some time for some individual purpose and, while many have been adapted to a multitude of other uses, there has always been a specific reason for the production of each grade when it made its first appearance.

The extreme purity of the granulated sugar produced by refiners in the United States is quite generally known to the manufacturer, but he quite often is not using the grade which will work to the greatest advantage with his equipment or he may desire to develop some new product which will require a different grade or grain size. It is attempted in this article, together with the chart, to assist such an individual to the fullest possible extent to gain a more satisfactory product with his equipment.

Much of the refined sugar is distributed by retailers for household use; largely in packages with some definite brand name such as "Jack Frost," which is used by this company. All of the sugar for manufacturing purposes is sold under the name of the company which produces it. Also all the sugar refined in the United States is sold through brokers who specialize in marketing this product.

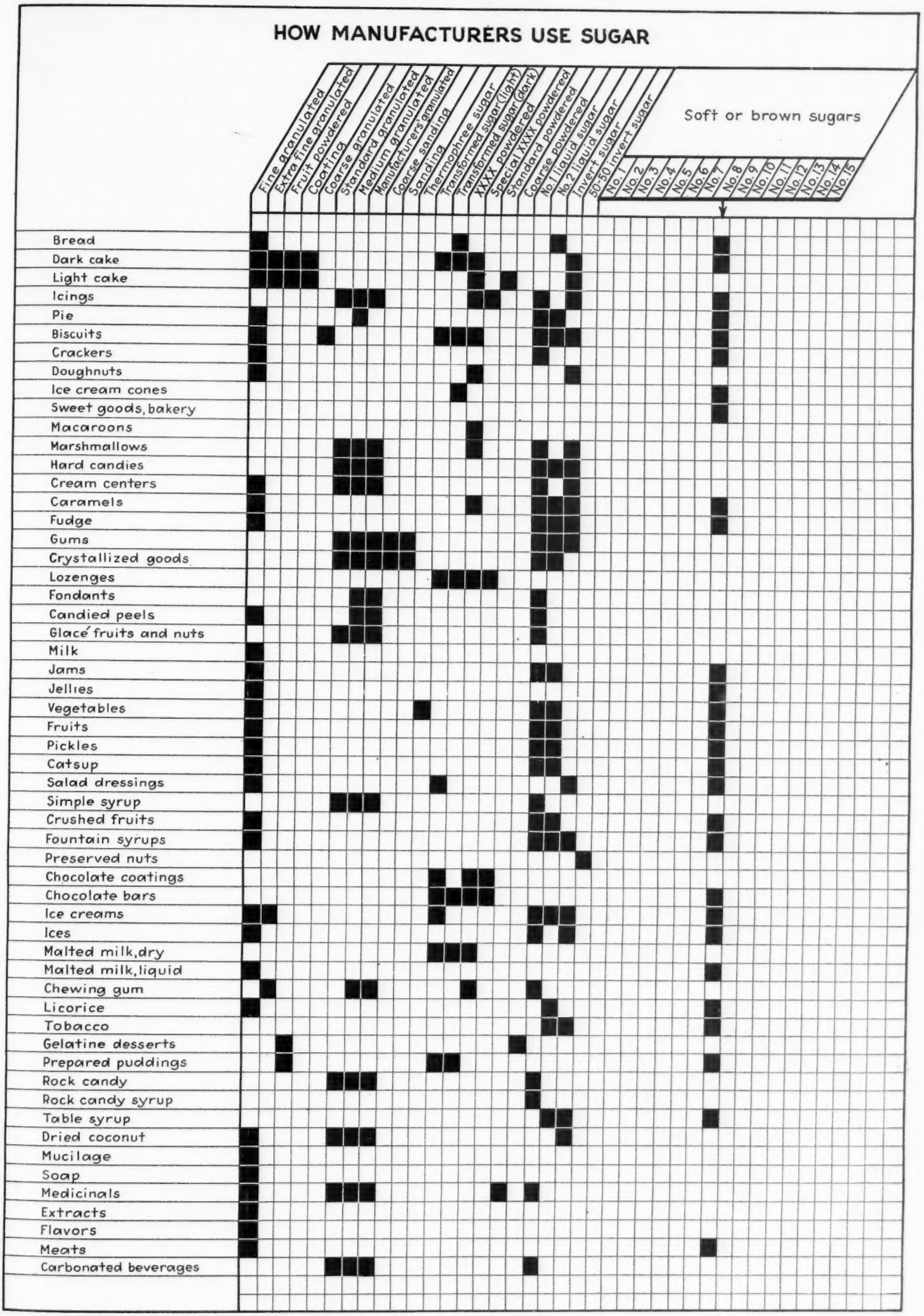
All contracts and price quotations of refined sugar are based on the fine granulated grade. This grade is of a somewhat smaller grain size than that found some years ago, because the general demand has been for a more rapidly dissolving sugar. As the finer grain gives a whiter appearance, the tendency has been to produce finer sugar. In the same class with Fine Granulated, which is the grade produced in by far the greatest quantity of all, there is produced Extra Fine Granulated, varying only in its smaller grain size; Fruit Powdered (which has nothing to do with fruit nor is it powdered), produced to use on fresh fruit because its grain is still smaller and therefore dissolves more readily; and the finest grain of all, called "Coating," used in specific instances where unusually fine crystals are desired. In general use, fine sugar is required because of its more rapid solubility, but in baking it is well known that finer grain sugar gives greater volume when creamed with shortening and a consequent improvement in cakes. Experience has taught, however, that beyond a certain point benefit from this increase in volume cannot be realized in the baked product, and experienced bakers quite generally employ a sugar corresponding in fineness to Fruit Powdered.

Next on the chart there are Coarse, Standard, Medium and Manufacturers' grades. These four sugars are produced especially for use where high-temperature cooking is necessary in making clear hard candies and very white fondants or pan-coated goods or where an extremely hard grain must be used. Aside from some use of Coarse Granulated as a decoration, the manufacturer is tending toward the use of the Manufacturers' Granulated, which varies from the others only in that it is the finest of the four and will dissolve much faster. The only difference in these is a successive reduction in fineness from Coarse to Manufacturers'. All have the same purity. In this same class also belong the Sanding sugars, which are used to sprinkle upon the surfaces of many soft candies and fruit products to keep them from sticking together. They are used also to sand gum drops and preserved fruits or similar substances which are to have further quantities of sugar crystallized upon their surfaces. The grains of Sanding sugar generally are nearly perfect and exact in size, but, if required, a grain can be produced which is known as a roll grain, which is an aggregate of several small grains and is used in pan work as a seed for producing colored sugar pellets or so-called "nonpareil seeds" for decorating cookies and candies.

Let me state that the refiner always is glad to cooperate with any manufacturer in the production of a sugar suited for his specific needs. But, of course, always remember that the refiner turns out millions of pounds of sugar daily at a very small margin of profit and, therefore, cannot be expected to produce quantities of a new grade in less than 10,000-lb. lots. This is the minimum quantity which may be sold direct by the refiner.

There are generally produced three grades of machine powdered sugar differing only in the degree of fineness: Coarse Powdered, having about the fineness of Coating sugar; Standard Powdered, being somewhat finer; and XXXX, commonly known as Confectioners', being as fine as practical to produce with the ordinary type of sugar mill. More efficient types of mills have been introduced recently. They are capable of turning out a still finer sugar which is quite free from coarse particles and which is variously designated. In the Mid-West territory we sell this sugar under the name of 6X and in the East as Special XXXX. This extremely fine powdered sugar is particularly valuable in preparing cold icings, which will remain soft many hours longer than icings prepared with ordinary XXXX sugar.

Powdered sugars may be treated to prevent them from caking. The usual and very efficient method is to add 3 per cent of cornstarch in such a way


HOW MANUFACTURERS USE SUGAR
Fine granulated
Extra fine granulated
Fruit powdered
Coarse granulated
Standard granulated
Medium granulated
Manufacturers granulated
Coarse sanding
Sanding
Thermophree sugar
Transformed sugar (light)
Transformed sugar (dark)
XXXX powdered
Special XXXX powdered
Standard powdered
Coarse powdered
No. 1 liquid sugar
No. 2 liquid sugar
Invert sugar
50-50 invert sugar
Soft or brown sugars
No. 1
No. 2
No. 3
No. 4
No. 5
No. 6
No. 7
No. 8
No. 9
No. 10
No. 11
No. 12
No. 13
No. 14
No. 15
Bread
Dark cake
Light cake
Icings
Pie
Biscuits
Crackers
Doughnuts
Ice cream cones
Sweet goods, bakery
Macaroons
Marshmallows
Hard candies
Cream centers
Caramels
Fudge
Gums
Crystallized goods
Lozenges
Fondants
Candied peels
Glacé fruits and nuts
Milk
Jams
Jellies
Vegetables
Fruits
Pickles
Catsup
Salad dressings
Simple syrup
Crushed fruits
Fountain syrups
Preserved nuts
Chocolate coatings
Chocolate bars
Ice creams
Ices
Malted milk, dry
Malted milk, liquid
Chewing gum
Licorice
Tobacco
Gelatine desserts
Prepared puddings
Rock candy
Rock candy syrup
Table syrup
Dried coconut
Mucilage
Soap
Medicinals
Extracts
Flavors
Meats
Carbonated beverages

that it may be thoroughly mixed. Lately a tri-calcium phosphate has been introduced for this purpose. Experiments indicate that 1 per cent of it is more effective than 3 per cent of starch, but its addition is not as yet permitted in some states.

The price of powdered sugar is 20 cents more per 100 lb. than the price of Fine Granulated. Recently many samples of powdered sugar were sieve-tested and the sugar produced from the new type of mill has been found much finer than any other sample tested, even though some brands are sold as 10X and 12X. There is no generally accepted standard for fineness of powdered sugar and the number of X's evidently means nothing in actual fineness.

Sugar for Canners

"Thermophree" sugar is produced especially for canners under carefully controlled conditions and checked through the bacteriological laboratory of the company to assure its freedom from thermophiles and spoilage bacteria. This sugar is particularly helpful in corn and peas or other neutral vegetables. Acid vegetables are not so subject to the growth of these types of bacteria. To all appearances it is similar to Fine Granulated sugar.

Transformed sugar, produced in the United States only by the National Sugar Refining Co., is really something different in the sugar world. The refining process is the same with this as with granulated sugar up to the point of granulation. Here the equipment produces a radically different product which is neither a single crystal nor the result of pulverizing. Instead, the particles, which are all small, are extremely irregular in their surface and are penetrated by cracks or recesses which cause the grain to crumble easily, and, because of the relatively large surface, to dissolve almost instantly when dropped in water. The ease with which these particles may be crushed permits their use in the manufacture of chocolate coatings without pregrinding and with considerable saving of power in the production of this product. The crevices in these grains are extremely small and naturally are full of air. When this sugar is used for creaming with shortening in the production of cake or in very dry dough for biscuits, this finely divided air cannot collect and escape in large bubbles but acts as a leavening agent and reduces the necessity for most, if not all, other leavening agents. Transformed sugar is dry and may be produced in a very fine and fluffy condition and, because of its rapid solubility, can replace powdered sugars in various dry prepared drinks and food mixtures.

At present there are seven grades of transformed sugar offered. Frostolite grade is very white and corresponds in purity to ordinary granulated sugar. A very fluffy Frostolite is called Clarolite. These are sold at the same price as Fine Granulated sugar. Ebolite is the darkest of a group of five grades all of which sell at 25 cents per 100 lb. under Fine Granulated. This grade has a light brown color and a true molasses flavor. Ambolite is of a somewhat lighter color and has less flavor. Duskolite is still lighter in color and has a slight flavor of refiner's syrup instead of molasses. Dimolite has very little color and flavor. Fluffolite is very much finer than and has the same quality as Dimolite. These sugars have found many uses ranging from cakes to ice cream cones and from prepared puddings to chocolate. Further grades may be produced as the need becomes apparent.

Liquid sugars are simply sugar solutions containing one part of water to two parts of sugar and are sold in two grades. No. 1 has the purity of the highest grades of sugar and is used quite generally for any purpose where dry white sugar would be used and where the presence of such a quantity of water would not be detrimental or require too much effort to remove it. This grade of sugar, because it is free from bacteria, is especially suitable in the preparation of fountain syrups and for several purposes where a clear solution of sugar saves the manufacturer the time usually required for dissolving and filtering. It has sufficient purity to be used in baking and in the manufacture of candies where the boiling equipment is sufficient to handle the excess water. No. 2 Liquid sugar is quite generally used where its slight color is not objectionable. It enters into large quantities of blended syrups, baked goods and candies. Both these products sell below the price of Fine Granulated.

Moisture-Retaining Sugar

Invert sugar is formed in many ways and in many products during the process of their manufacture, but it is sold in commercial quantities by very few producers. Invert sugar is essentially the same as honey and its specific use is to retain moisture in the product in which it is introduced. It is a mixture of two sugars, one half being levulose which cannot be crystallized because of its affinity for water. Invert sugar is being used in an increasingly large volume in a great variety of food products and is replacing glycerine in adhesives and in many products where complete drying out is not desirable if the drying may result in cracking or crumbling. All candy contains some invert sugar which is produced to a limited extent even by boiling cane sugar with water. In fact it is almost impossible to free cane sugar from traces of invert sugar. Clear hard candies may be produced containing about 17 per cent of invert sugar and soft fondants require it to retain their smoothness and softness. It is also used in icings for cakes and to retain the softness in fruit fillings for biscuits and cakes. It is also used in the body of the cake itself to retain freshness. Mixtures of half and half invert sugar and cane sugar may be used where thick, heavy syrups are required. While Liquid sugar is a saturated sugar solution with two parts of sugar and one part of water and will not crystallize under normal temperatures, it is possible to make much heavier solutions of a mixture of invert sugar and cane sugar and no crystallization will occur under normal conditions.

Fifteen Grades of Soft Sugars

Soft or brown sugars are graded according to color and range from a nearly white No. 1 to No. 15, which is as dark as roasted coffee. These sugars are boiled in such a way as to produce a rather soft grain which has occluded or built up in its structure a portion of refiner's syrup, which may in the lower grades constitute nearly 25 per cent of the total weight of the sugar. These sugars are all moist sugars and the invert sugar content and the non-sugars increase with the color. These sugars have a wide range of uses and enter into most any food product where color is desirable. They give delightful color and flavor to a vast number of our foods, probably the largest quantity being used in the baking industry. Quantities are used in the curing of meats and in tobacco and licorice products as well as many candies. Soft sugars are highly refined sugars which are generally free from bacteria and should never be confused with the old molasses sugars or with imported partly refined sugar, or raw sugar. They contain such ingredients as occur in the original juices of the cane and for which the bone charcoal used in the refining of sugar has not sufficient affinity to remove them from the solutions. Certain salts and certain organic compounds are readily removed from solutions by treatment with bone charcoal, while other things are not. These soft sugars range under the granulated base price from 15 cents per hundred in the case of No. 1 to 75 cents for No. 15.

Time has bestowed an undeserved halo upon many old-time products. Occasionally some person expresses regret that he cannot obtain some formerly used grade of sugar which his memory has endowed with almost marvelous qualities. Please accept my assurance that the best sugars obtainable which antedate the grades on the chart were inferior to refined sugars produced today. This is necessarily true because of the then lack of chemical control which now governs every step in the refining process and guarantees that prime requirement, a uniform product. The different grades on the chart will suffice for all usual needs, but if you feel that they are not sufficient the refiner will be glad to help you.

How to Prevent Caking In Powdered Foods

By H. V. MOSS
Chief Chemist
Provident Chemical Works
St. Louis, Mo.

MOST powdered food products have a tendency to absorb moisture and then cake. How much is lost annually from this cause cannot be estimated, but the total amount must be fairly large, since all manufacturers, distributors and users of these products contribute something to it.

Such losses have been considered one of the necessary evils of the business. They can, of course, be reduced—at least as far as the manufacturer and distributor are concerned—by the use of airtight packages. But the cost of packaging of this kind is justified only for a small proportion of the total output of powdered foods. For the great bulk of these products, it costs less in the long run to use cheaper packages and to accept a certain percentage of loss.

Chemists and food manufacturers, however, have been giving considerable thought to this problem. It is not only desirable to cut losses due to caking but the markets for several powdered foods can be greatly expanded if some economical means can be discovered to keep them in condition while they are in the housekeeper's pantry. With certain foods, the use of some of the newer wrapping materials has proved of great value, but with others it is preferable to overcome the tendency to cake by the employment of an effective conditioner.

The use of conditioners has long been common practice, but the number suitable for use in food products is very limited. To be satisfactory as a conditioner for foods, a substance must not only prevent caking but it must be non-injurious to the health; it must be tasteless, odorless and colorless; it must leave no objectionable sediment when used in soluble foods; and it must be relatively inexpensive. Furthermore, it must be acceptable to the public. It is hardly likely that foods marked "1 Per Cent Added Sand" or "½ Per Cent Brick Dust" would command a ready sale, even if such additions were permissible.

Among the substances commonly used as conditioners (and not as adulterants) are magnesium carbonate for salt, tri-calcium phosphate for salt, and starch for powdered sugar and some other food products.

Little has been published in regard to the relative effectiveness and range of usefulness of these and other substances that might be used for conditioning purposes. To determine these characteristics, it was necessary to develop a standard method of effecting caking in powdered foods. It consists of first exposing for one hour the samples to be tested in an atmosphere having a relative humidity of 75 or 76 per cent, at 40 deg. C., and then drying them in an oven at 40 deg. C. for an hour. The degree of caking is then determined by prodding the samples with a stiff steel wire.

With 1½ per cent of various conditioners in table salt, the following results were obtained:

Substance	Relative Effectiveness
Tri-calcium phosphate (grade A)	100
Magnesium carbonate, basic	95
Tri-calcium phosphate (grade B)	90
Hydrate of lime	65
Sodium bicarbonate	50
Di-calcium phosphate	40
Calcium sulphate, anhydrous	30

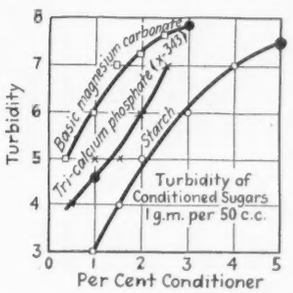
It will be seen from this table that tri-calcium phosphate and magnesium carbonate are greatly superior as conditioners for salt.

The two samples of tri-calcium phosphate were both commercial products of edible grade, but they differed perceptibly in their cake-inhibiting properties. Further research showed that these properties depend upon several physical and chemical factors, including particle size, moisture content and the presence of small amounts of other elements, especially aluminum and iron. When the influence of these factors was clearly understood, it became possible to make a special grade of tri-calcium phosphate of uniformly high cake-inhibiting efficiency.

Tests with XXXX powdered sugar gave the following results:

Substance	Rating
Tri-calcium phosphate	Best
Magnesium carbonate, basic	Nearly as good
Starch	Poorest

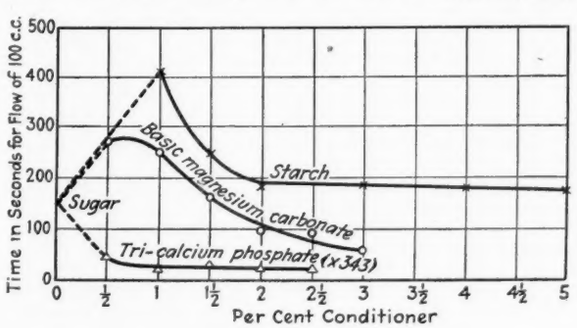
Other tests showed that when added to XXXX sugar in the proportion of 1 per cent, tri-calcium phosphate prevents formation of lumps in stored sugar and also improves its free-flowing qualities, making it easier to measure and mix. On the other hand, starch, the conditioner ordinarily used for powdered sugar, actually causes the sugar to flow less freely. Bakers' tests prove that phosphate-filled sugar is as satisfactory as pure sugar for making cold icings and that the slightly uncooked taste noticeable when starch-filled sugar is used, is eliminated.



Sugars, protected from caking by conditions, dissolve with varying turbidities. Black circles on the curves represent equivalent anti-caking effects.

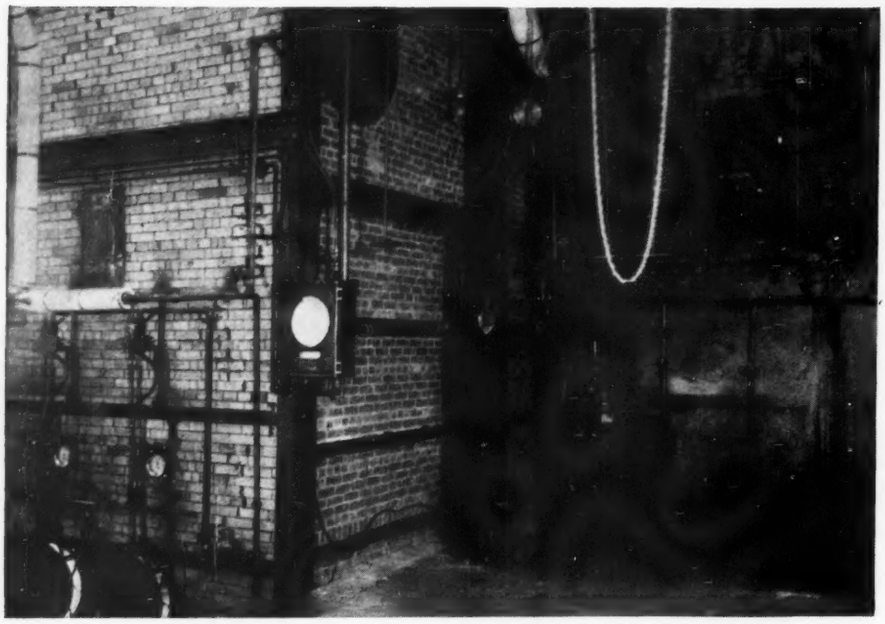
Experiments are being conducted also on the use of tri-calcium phosphate in granulated sugar, dried milk and other powdered food products, and in all cases the preliminary results are highly satisfactory. It is as yet too early to predict the extent to which this substance can be used in powdered foods, but, according to present indications, it will eliminate most of the caking troubles experienced with many.

Tri-calcium phosphate has been introduced into foods for many years. It is one of the end products formed when acid calcium phosphate is employed as a leavening agent in baking powder, self-rising flour and phosphated flour, and also is largely used for conditioning table salt. Recent bio-chemical research indicates that calcium and phosphorus supplement the average diet in a desirable way. Hence, tri-calcium phosphate seems well adapted to general use as a food conditioner.



Different conditions exert differing specific effects on the rate of flow of XXXX sugar. Increasing the quantity of starch slows down the flow.

For a detailed discussion of the scientific aspects of this problem, the reader is referred to "Tri-Calcium Phosphate as a Caking Inhibitor in Salt and Sugar," *Ind. and Eng. Chem.*, Vol. 25, February, 1933; p. 142—EDITOR.



New steam plant on left with latest devices for controlling fuel feed, air intake and dampers replaces the old-style plant on right, with a fuel saving of more than 15 per cent.

National Grain Yeast Corp. Reequips for Profit and Quality

By HAROLD L. KING
Production Manager,
National Grain Yeast Corp.
Belleville, N. J.

OUR general modernization program has been in process of actual practice for the past two years and so far every dollar expended has not only been returned in a short time but has turned out to be a sound investment. The results have been lowered manufacturing costs through greater operating efficiency and improved quality of products through better control of production operations.

The major part of this program was initiated as a result of a careful study of every item of manufacturing costs to determine where and how costs of production could be reduced and how, at the same time, the quality of our products could be improved. This study revealed that reductions could be made in the cost of purchased electrical energy, of generating steam for power and process heating, and of producing low-pressure air for aeration. Also, it showed that through this modernization our direct labor cost would be lowered because of increased productivity. This study also showed that both lower production cost and improved quality of product could be obtained by installing an up-to-date refrigerating system, new air-filtering equipment and improved yeast molding and cutting machinery.

In an endeavor to lower the cost of our purchased electrical energy, every effort was made to effect an even distribution of load and to eliminate excessive demand peaks. But, under the best conditions possible with manual control, we were unable to obtain the best rates for wholesale industrial power.

Our goal was the so-called "night-rider" rate, which is calculated as follows: When the total energy consumed exceeds 500 times the average demand in kilowatt-hours, a separate meter is installed to record all energy consumed between the hours of 8 p.m. and 8 a.m. This power is billed at $0.006 per kilowatt-hour instead of at the usual $0.01 rate. Another advantage under this rate is the lower demand charge. Instead of using the high peak for the whole 24 hours, the demand becomes the average of the two high peaks: the day peak and the night peak. Naturally, under these conditions, the incentive is to arrange operations so as to throw all heavy loads on at night to get full advantage of the lower night rates. We were just on the border line and helpless as long as we depended upon manual control.

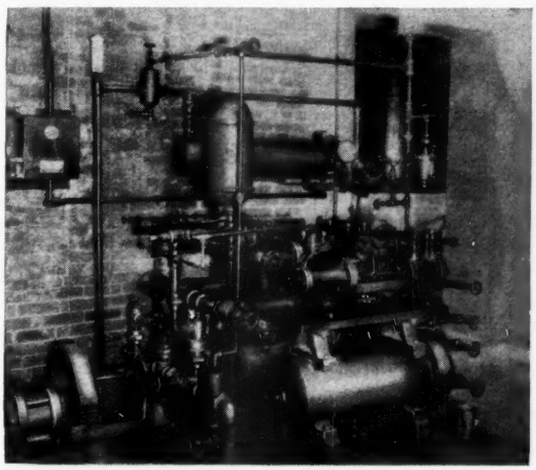
However, through the installation of an Edmore power-demand limitator, we secured greater efficiency in the use of purchased electrical energy, met the "night-rider" rate requirements, and made a saving of approximately 17 per cent in total power cost. This apparatus automatically limits the load to a desired maximum demand by operating bypass unloading valves on high-pressure air compressors and ammonia compressors. Unloading of these motors takes place in succession and is so timed and controlled that there is no interference with production processes. Under the conditions existing at the time this installation was made, our savings amounted to $300 per month and were sufficient to pay for the installation in nine months.

In the production of baker's yeast, large volumes of low-pressure air are required for aeration in the cultivation vats, and, when produced by purchased energy, these represent about 60 per cent of the total cost of purchased energy. At the same time there is a large demand for steam for process heating, hot water and sterilization purposes.

Our plans for modernization and expansion called for a new steam plant and a new low-pressure air compressor. To reduce our costs further, it was de-

cided to generate steam at pressure and temperature suitable for operating an extraction turbine for driving a centrifugal air compressor and to extract low-pressure steam from the turbine for process heating.

The new steam plant, furnished by the Riley Stoker Co., consists of a 309-hp. Badenhausen water-tube boiler with four fusion-welded drums built for 205-lb. working pressure. The fourth drum is a dry steam drum and delivers 5 to 15 deg. F. superheated steam to the superheater. A feature of this new type boiler is the design and arrangement of the drums and tubes based upon the ring-flow principle of circulation. Very large water circulation areas through boiler tubes and drums allow continuous unrestricted flow. Increasingly rapid positive circulation in a fixed direction in all the tubes as the steam output increases assures relatively low flue-gas temperatures and permits economical operation at very high steaming rates.



Fuel oil is supplied to burners under boiler by a duplicate steam pump unit equipped with steam oil heaters. An electric oil heater permits starting burners from a shutdown even in cold weather.

Additional equipment on the boiler include a Riley-Badenhausen pendent type superheater which is designed to give a final steam temperature of 520 deg. F. at 200 per cent of rating; Diamond automatic valve-in-head soot blowers; continuous blow-down system, in addition to the regular bottom blow-down connection; and continuous feed-water distributing system which distributes the incoming feed water over the entire length of the drum instead of being concentrated on one place, as found in the older type boilers.

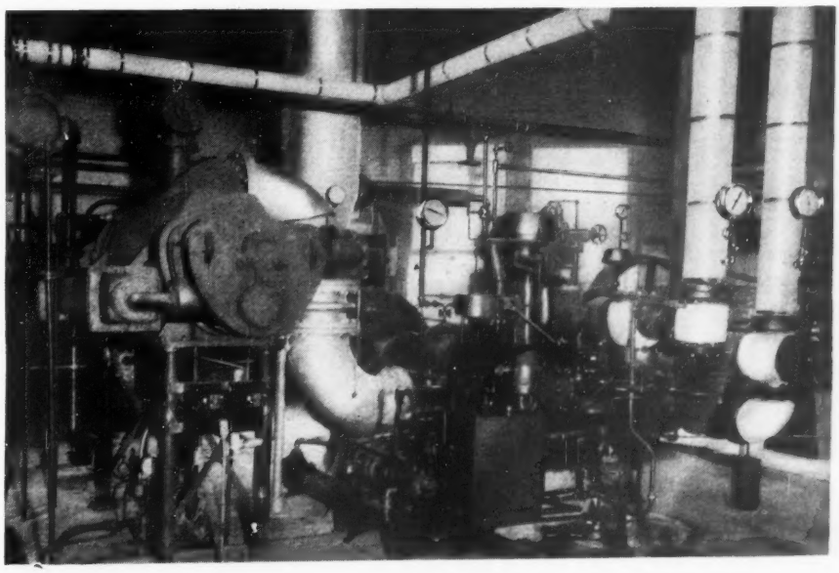
The steam plant is fitted with equipment for burning bunker oil, grade C. This installation was supplied by Webster Engineering Co. and consists of two Webster register type steam-atomizing burners, one Hammel duplicate steam pump set with double steam-circulating oil heaters cross-connected in such a way as to permit single or duplicate operations on each heater. Each pump and heater is guaranteed to carry over 500 hp. In addition, provision is made for starting the boiler from a dead shutdown. This is accomplished by the use of a Weaco 6,000-watt automatic electric preheater with a capacity of 100 gal. of oil per hour in connection with a Viking back-geared motor-driven pump. The pump is supplied with a bypass release valve.

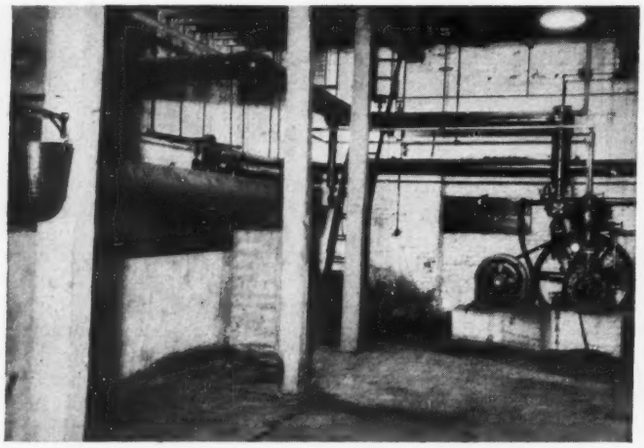
Automatic combustion control is obtained through use of the Merit System, manufactured by the Associated Engineering & Supply Co. of San Francisco, a subsidiary of the Westinghouse Air Brake Co. It was installed in conjunction with the Webster oil-burning unit. This system automatically controls the flow of oil to the burners and regulates dampers according to the steam pressure and load on the boiler. A master controller responds to fluctuations in boiler pressure and regulates burner flames by operating combination oil- and steam-firing valves, with simultaneous regulation of dampers and air louvers. This positive and automatic response to all sudden changes in boiler loads eliminates the uncertainties of manual control and results in a fuel saving of from 5 to 10 per cent.

A Bailey boiler meter was installed as an aid in maintaining maximum efficiency of boiler operation. This meter measures and records the steam flow and also the air supplied to the burners for combustion. The recorded readings indicate whether or not the proper ratio between these two factors is being maintained to insure proper combustion. The lower cost of generating steam with the new plant is effected through much higher boiler efficiency. The manufacturer has guaranteed an efficiency of 82 per cent at 100 per cent rating with a minimum of 80 per cent at 200 per cent rating. In actual performance we are obtaining a 24-hour average of 82 per cent with boiler load fluctuating between 80 and 160 per cent rating. The boiler will deliver 18,840 lb. of steam per hour at 195-lb. working pressure, giving a final temperature of 520 deg. F. with feed water at a temperature of 212 deg. F.

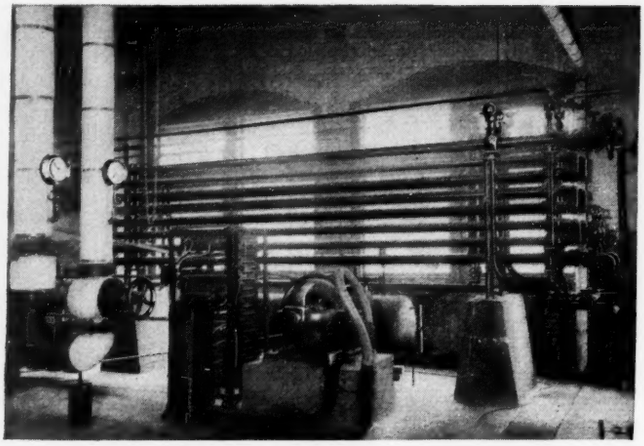
The turbo-compressor is of the latest design, built by the General Electric Co., and consists of a single-stage centrifugal air compressor driven through a speed-increasing gear by a two-stage extraction condensing turbine. The turbine has an opening for extracting steam at from 5 to 15 lb. pressure for process heating. Excess steam passes through an Ingersoll-Rand surface condenser connected to a steam-jet vacuum pump allowing operation under a vacuum of 28 in. of mercury. A governor is provided to maintain the extraction steam pressure approximately constant and can be set to hold any pressure between the limits of 5 and 15 lb. per square inch. Steam at 180-lb. pressure at the throttle and 150 deg. F. superheat is admitted to the turbine through a series of five steam admis-

Low-pressure air for aerating yeast-growing vats and byproduct steam for process heating are produced by a specially designed turbo-compressor.





An automatically controlled unit supplies 40 per cent more refrigeration yet occupies one-third floor area required by older unit.



Ammonia condensing equipment alone of old refrigerating system requires almost as much floor space as entire installation of new system.

sion valves which are actuated by a spring-loaded oil-operated piston. The valves open in sequence under direct control of the discharge-air constant-pressure governor, thus automatically obtaining maximum efficiency at partial loads. A centrifugal excess-speed governor prevents speeds above that required to produce the maximum specified discharge pressure. In addition, an emergency governor is provided to shut off steam to the turbine in case of accidental derangement of the excess-speed governor. This insures that the speed will not increase above the safe limit for the rotating element.

Forced-feed lubrication is obtained from a gear pump driven through worm and gear from the main shaft. Since both speed governors and steam admission valves are operated by oil pressure, it is impossible to admit steam and start the turbine until there is sufficient internal oil pressure to lubricate all moving parts. Both in starting the turbine and at speeds too low to maintain the proper oil pressure, a motor-driven auxiliary oil pump automatically operates to supply complete internal lubrication and sufficient pressure for governor operation.

Any change in the volume of air required at any time is automatically taken care of by the constant-pressure governor on the turbine. Opening or closing of air valves on any vat, resulting in a lowering or raising of the discharge air pressure, as the case may be, immediately actuates the constant-pressure governor to increase or decrease the speed of the turbine and thereby regulates the volume of air required to maintain a specified constant pressure. This arrangement gives volume regulation through constant pressure control. The governor is provided with an adjustment for setting at any desired pressure between two specified limits and with features which permit remote control of the pressure setting.

The centrifugal compressor delivers air at a constant pressure in the proper volume for the aeration of the cultivation vats in process at all times. This air must be free from all bacteria and dust particles in order to assure the best quality of yeast. Such biologically pure air is obtained by filtration, through dry process "Air Mat" air filters, manufactured by the American Air Filter Co. These filters afford a very large filtering area and allow the air to pass through the filter pads at a very low velocity, thus removing all dust and microorganisms before it is supplied to the compressor. This air is conducted to the various vats through a system of air mains composed of 24-in., 18-in., 16-in. and 12-in. lines of galvanized welded steel construction. The volume of air going to the various cultivation vats is measured and controlled by a Brown electric air-flow meter. This instrument operates on the inductance bridge principle. A drop in air pressure through an orifice plate sets in motion a float in the mercury monometer. The movement of this float is transmitted magnetically to the indicating and recording instruments, which are calibrated to read directly in cubic feet of air per minute.

The design and construction of the turbo-compressor unit is such that changes can be made at very little expense. These changes may increase the capacity and output of the unit to take care of expansion requirements up to 100 per cent over present rated capacity.

All piping for the steam plant and turbine is extra heavy steel pipe of welded construction with welded fittings and long sweep bends. Full thickness, squared-cornered Van Stone flanges were used in several instances to facilitate installation. This work was performed by our own men with our own General Electric welding apparatus.

The estimated saving from the new steam plant and the turbo-compressor is $15,000 per year.

The automatic refrigeration unit consists of a York double-cylinder ammonia compressor of the single-action inclosed vertical type. It has a short-center V-belt drive developed particularly to accommodate higher rotating speeds with maximum efficiency and minimum operating and maintenance expense. Positive forced-feed lubrication and complete filtration of the circulating oil are features of the system. A rotary gear pump circulates oil from the crankcase through the main bearing to the crankshaft, crankpins and into

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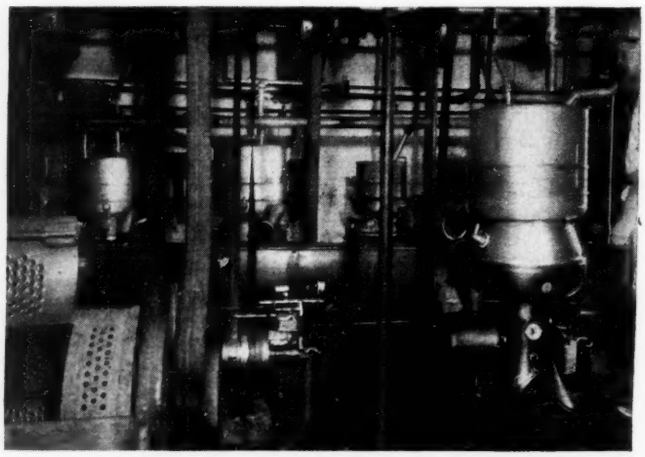
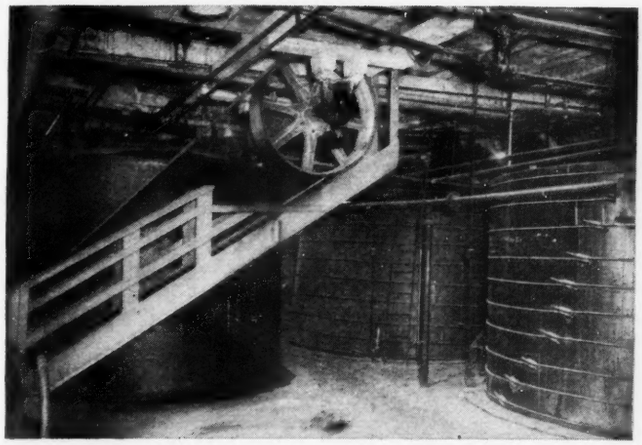
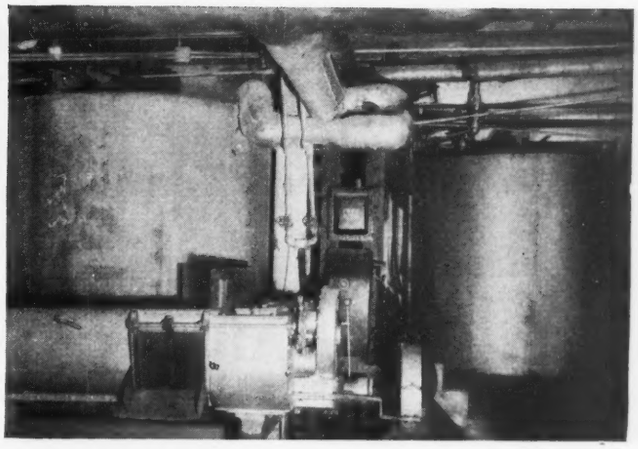


Low-capacity belt-driven centrifugals are being replaced by super-centrifugals with totally inclosed, built-in motors.



Overhead belt drives on vat agitators require extra overhead space in addition to being cumbersome and unsightly.



Direct-connected worm-gear drives for agitators of storage and mash tanks reduce expense, also noise, of operation.

the oilways of the wrist-pin bushings.

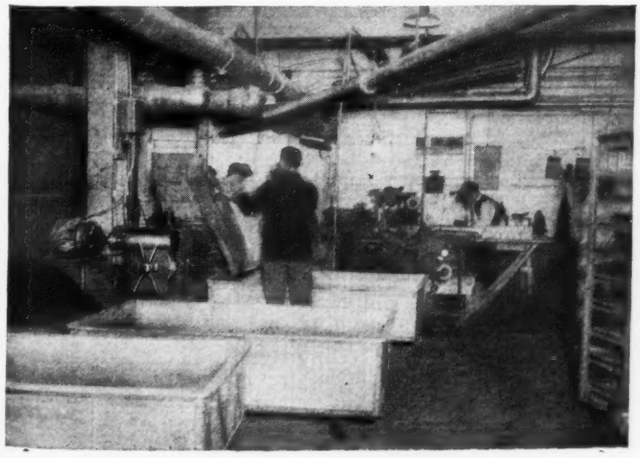
Electrical control is obtained through an automatic control panel for either thermostatic or manual operation. It is equipped with a mercury safety switch and lever station indicating automatic or manual operation. The safety switch cuts out the motor and shuts down the compressor whenever for any reason the ammonia pressure becomes excessive. An electrically operated bypass unloading valve allows thermostatic regulation of brine temperature by automatic stopping and starting of compressor. Temperatures of cold-storage rooms are controlled at 34 deg. F. through thermostatic operation of Sylphon valves on brine lines to regulate the flow of cold brine to the cooling coils of the air-conditioning units.

Both the ammonia condenser and the brine cooler are of the horizontal shell-and-tube closed type with the cooler submerged in the brine storage tank. This arrangement saves floor space and reduces insulating costs to a minimum. This new installation complete occupies only one-third the floor space required by the old system yet it supplies 40 per cent more refrigeration. Automatic valves operated by the pressure on the compressor regulate the flow of water to the ammonia condenser and the cooling jackets on the compressor. Throughout the cold-storage room, the old-style brine circulating pipe coils have been replaced by Carrier Engineering Co. motor-driven cold-air diffusers. They assure a constant low temperature and humidity control. Economic operation at high efficiency of the new refrigerating system has resulted in the complete shutdown of the old system and 40 per cent more refrigeration is obtained at even a lower cost than that of operating the old system.

All cumbersome and unsightly overhead drives, consisting of power-consuming shafts, pulleys and belts, are being replaced by direct-connected worm-gear drives. Belt-driven centrifugal yeast separators are being replaced by double-capacity super-centrifugals with totally inclosed, built-in, direct-connected motors. Present plans call for complete replacement of all overhead shafting and belt drives, which will eliminate a large item of maintenance expense. Totally inclosed moisture-proof motors with magnetic starters are being supplied on all new equipment. Operating conditions demand this extra protection. In many cases, especially on motor-driven pumps, remote pushbutton stations save hundreds of steps and give increased effective capacity to the individual workman.

In the yeast-cutting department production has been greatly speeded up, with a resulting cut in labor cost. This saving has been obtained through the introduction of a new idea in yeast-cutting machinery. This machine turns out a product of greatly improved texture and produces cakes uniform in size and weight. It has a capacity of 85 to 90 one-lb. cakes of yeast per minute and replaces three old style 30-lb.-per-minute machines with the elmination of two operators. The new cutting machine supplies 1-lb. cakes of yeast to two automatic wrapping and sealing machines, and gives this unit a capacity of over 5,000 lb. per hour. Other equipment designed to give our workmen in the cutting departments a higher rate of production has been built to our own specifications. Care has been taken in the construction of this equipment to choose the material best suited to the particular service, the choice usually being from Monel metal, stainless steel and aluminum alloys.

Proof of the success of our modernization program lies in our ability to produce yeast of a quality which has given rise to 1,000 per cent increase in demand at standard prices and at a profit which permits paying for the new installations out of earnings. Throughout this depression period we have continually added to our payroll without any reduction in the standard rate of wages. These results have led us to conclude that in order to establish ourselves firmly in our industry and to prepare for better things, which are bound to come, we must continue to discard old-fashioned ideas and methods and continue to modernize. Results obtained thus far have proved that every dollar expended by us on modernization is being repaid and that the installations will continue to produce profits.



Low, thick-walled aluminum trucks are used for transferring yeast from filter presses to mixer and to molder-cutter

How Tight Are Screw Caps?

Mechanical Tests Show No Woman Can Open All

By M. L. CARR
Director of Laboratory
Pittsburgh Testing Laboratory
Pittsburgh, Pa.

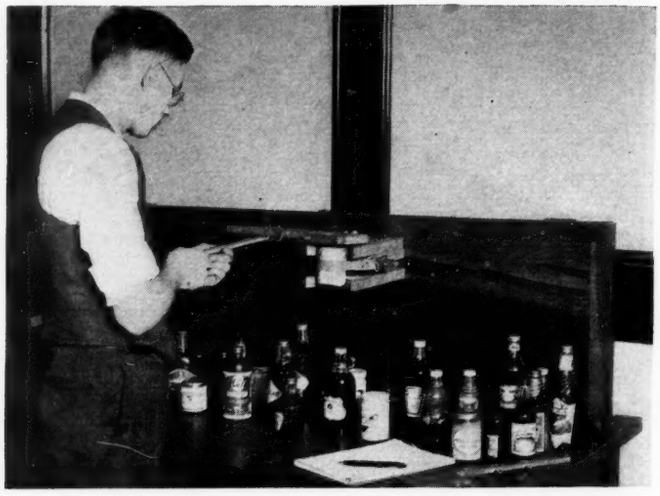


Fig. 1—Apparatus used to determine the twisting effort required to remove caps.

SCREW caps used for closing the containers in which foods and other products are packed must be tight enough to protect the contents of the package, but they must also be easy for a woman to remove. That the twisting effort a woman can exert in unscrewing a cap is strictly limited was shown in the Pittsburgh Testing Laboratory tests reported in FOOD INDUSTRIES for March. To determine how her strength compared to the twisting effort actually required to do the job was the object of a second series of tests which will be reported in this article.

As a first step in this comparison we determined the twisting effort needed to open commercially packed products. Investigation showed that there are two methods of applying screw caps to containers, and that the method used influences the twisting force required to remove them. By one of these methods, the threads are preformed in the closure manufacturer's plant and must fit preformed threads on the container. In the other system, the threads are rolled into the cap at the packer's plant, over the container threads as a matrix, while the cap is held on the container

Fig. 2—Comparison of twisting effort required to remove 28-mm. caps with the twisting effort that women can exert on caps of this size, also progressive average curves showing twisting effort to remove 28-mm. rolled-on and preformed screw caps.

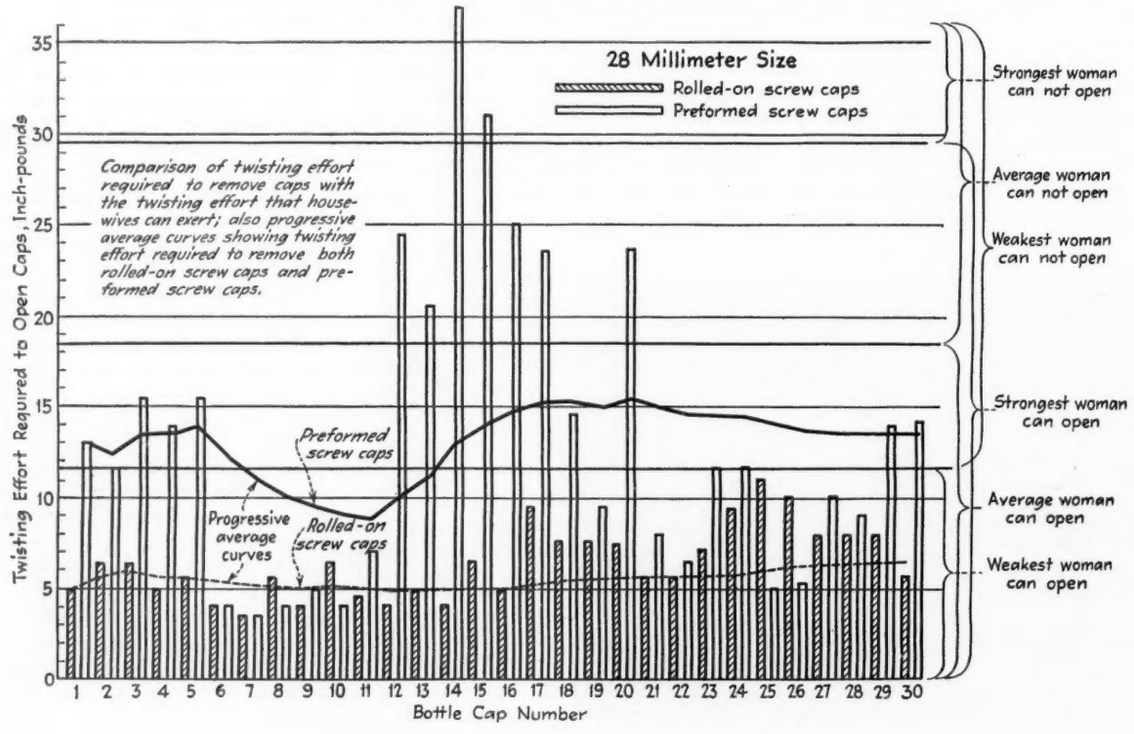

28 Millimeter Size
Rolled-on screw caps
Preformed screw caps
Comparison of twisting effort required to remove caps with the twisting effort that housewives can exert; also progressive average curves showing twisting effort required to remove both rolled-on screw caps and preformed screw caps.
Preformed screw caps
Progressive average curves
Rolled-on screw caps
Strongest woman can not open
Average woman can not open
Weakest woman can not open
Strongest woman can open
Average woman can open
Weakest woman can open
Twisting Effort Required to Open Caps, Inch-pounds
Bottle Cap Number
0
5
10
15
20
25
30
35
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Table I—Mechanical Opening Tests of 28-Mm. Rolled-On Screw Caps

Cap No.	Packer	Product	Twisting Effort to Open, In.-Lb.	Sealing Medium
1	2	Vinegar	4.9	Cork
2	2	Vinegar	6.4	Cork
3	2	Vinegar	6.4	Cork
4	2	Vinegar	4.9	Cork
5	2	Vinegar	5.6	Cork
6	1	Vinegar	4.1	Wax Paper on Cork
7	1	Vinegar	3.4	
8	1	Vinegar	5.6	
9	1	Vinegar	4.1	
10	1	Vinegar	6.4	
11	28	Syrup	4.5	Cork
12	28	Syrup	4.1	Cork
13	28	Syrup	4.9	Cork
14	28	Syrup	4.1	Cork
15	19	Fruit Juice	6.4	Cork*
16	5	Fruit Juice	4.9	Cork
17	5	Fruit Juice	9.4	Cork
18	5	Fruit Juice	7.5	Cork
19	19	Fruit Juice	7.5	Cork
20	19	Fruit Juice	7.3	Cork*
21	2	Sauce	5.6	Cork
22	2	Sauce	5.6	Cork
23	12	Sauce	7.1	Cork*
24	12	Sauce	9.4	Cork
25	2	Olive Oil	10.9	Cork
26	2	Olive Oil	10.1	Cork
27	12	Sauce	7.9	Cork
28	12	Sauce	7.9	Cork
29	12	Sauce	7.9	Cork
30	12	Sauce	5.6	Cork
		Average	6.35	

* Sealing cork cut by bottle top.

under pressure. The first of these caps will be referred to as the preformed screw cap and the second will be called the rolled-on screw cap.

Containers used in these tests were purchased on the open market by a member of the laboratory staff, who was instructed to buy as many different kinds of food products, using 28- and 63-mm. cap sizes, as he could obtain. He endeavored to get a container with each type of cap for each product bought. He also purchased from as many stores as possible, in order to obtain a fair average sample of what the market afforded. A variety of products was obtained in order to allow for any effect that the product might have on ease of opening. Altogether, 90 capped containers were purchased for the tests from 25 different stores. In addition, 30 containers of various products, with 63-mm. caps, were obtained directly from the stock of a large food-packing company.

To make these tests, a special apparatus was used which is shown in Fig. 2 This apparatus, consisting of two clamps and a spring balance, was described as to design and operation in Food Industries, March, 1933 (see "How Strong Is a Woman?" by M. L. Carr).

The containers tested were divided into four groups, as follows:

(1) 30 with 28-mm. rolled-on screw caps
(2) 30 with 28-mm. preformed screw caps
(3) 30 with 63-mm. rolled-on screw caps
(4) 30 with 63-mm. preformed screw caps

Test results are recorded in Tables I, II, III and IV, in which are given the code number of the packer, the product in the container, the twisting effort determined by the apparatus as necessary to open the container, and the sealing medium or liner used in the cap.

To open 28-mm. rolled-on screw caps required a twisting effort varying from 3.4 to 10.9 inch-pounds, with an average for the 30 tests of 6.35 inch-pounds.

Table II—Mechanical Opening Tests of 28-Mm. Preformed Screw Caps

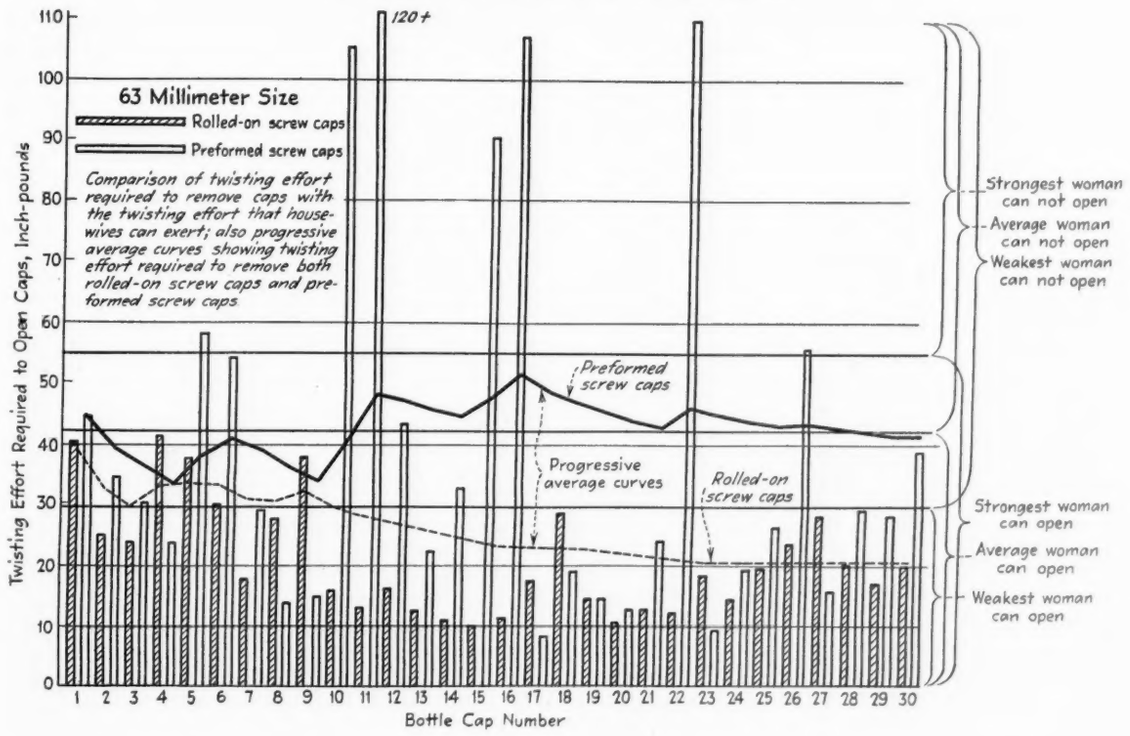
Cap No.	Packer	Product	Twisting Effort to Open, In.-Lb.	Sealing Medium
1	10	Vinegar	13.1	Cork
2	10	Vinegar	11.6	Cork
3	10	Vinegar	15.4	Cork
4	10	Vinegar	13.9	Cork
5	10	Vinegar	15.4	Cork
6	3	Vinegar	4.7	Cork*
7	3	Vinegar	3.4	Cork*
8	3	Vinegar	4.1	Cork*
9	3	Vinegar	4.9	Cork*
10	3	Vinegar	4.1	Cork*
11	6		7.1	Cork
12	15	Fruit Juice	24.4	
13	15		20.6	
14	15		38.2	Wax Paper on Heavy Paper
15	24	Syrup	31.1	
16	11	Syrup	25.1	
17	11	Syrup	23.6	
18	11	Syrup	14.6	
19	21	Syrup	9.4	Foil on Heavy Paper
20	15	Fruit Juice	23.6	Wax Paper on Heavy Paper
21	4	Dressing	7.9	
22	4	Dressing	6.4	
23	25	Olive Oil	11.6	Fine Grained Cork
24	16	Dressing	11.6	Wax Paper on Heavy Paper
25	9	Dressing	4.9	Cork†
26	9	Dressing	5.2	Cork†
27	20	Dressing	10.1	Cork
28	20	Dressing	9.0	Cork
29	13	Dressing	13.9	Wax Paper on Cork
30	13	Dressing	14.2	
		Average	13.4	

* While bringing another bottle of this same type from the store, the cap worked loose and contents spilled.

†Other bottles of this type showed "breathing" action while in the laboratory.

For 28-mm. preformed screw caps, the twisting effort varied from 3.4 to 38.2 inch-pounds, the average being 13.4 inch-pounds for 30 tests. Sixty-three-

Fig. 3—Comparison of twisting effort required to remove 63-mm. caps with the twisting effort that women can exert on caps of this size, also progressive average curves showing twisting effort to remove 63-mm. rolled-on and preformed screw caps.


120+
63 Millimeter Size
Rolled-on screw caps
Preformed screw caps
Comparison of twisting effort required to remove caps with the twisting effort that housewives can exert; also progressive average curves showing twisting effort required to remove both rolled-on screw caps and preformed screw caps
Preformed screw caps
Progressive average curves
Rolled-on screw caps
Strongest woman can not open
Average woman can not open
Weakest woman can not open
Strongest woman can open
Average woman can open
Weakest woman can open
Twisting Effort Required to Open Caps, Inch-pounds
Bottle Cap Number

millimeter rolled-on screw caps required a twisting effort varying from 10.1 to 41.3 inch-pounds, with 20.8 inch-pounds average for 30 tests. Opening 63-mm. preformed screw caps took twisting effort varying from 8.3 to over 120 inch-pounds (this reading was beyond the capacity of the testing apparatus), with an average for 30 tests of 41.3 inch-pounds.

We found, in the tests reported in the first article of this series, that the average woman could exert with her bare hands a twisting effort of 18.5 inch-pounds on 28-mm. screw caps, and 42.1 inch-pounds on 63-mm. screw caps. This indicates that the average woman is strong enough to open the average screw-capped container. Averages, however, flatten out maxima and minima and do not tell the whole story, so, to determine what percentage of caps a woman of any given strength is able to remove, we prepared the charts shown in Figs. 2 and 3. On these charts are plotted the results of the mechanical opening tests and the summarized results of the tests of woman's ability to exert twisting effort.

The test numbers along the bottom of these charts correspond to the numbers of the tests reported in the tables. This results in grouping the products according to variety, so that, for instance, two bottles of vinegar with 28-mm. caps, one of the rolled-on variety and the other preformed, appear side by side. The data plotted on Fig. 2 are for the 28-mm. size, while Fig. 3 is for 63-mm. caps.

How adequate a woman's strength is for this job of opening containers is shown clearly by these charts. Considering only those women whose strength is that of the average housewife, as determined in the tests already described, we find that on this basis they would be able to take the screw caps off any container closed with either 28- or 63-mm. rolled-on screw caps. With the preformed screw caps, the picture is not quite so favorable, for the woman of average strength would fail with 23 per cent of the 28-mm. size and with 33 per cent of the 63-mm. caps.

The strongest woman, as determined by the test, would be considerably more successful, though she also would get into some trouble. Of course, she also would be as effective in removing rolled-on screw caps as the average woman, being able to take off all she encountered, in either size. With the preformed screw caps, however, she would fail with 7 per cent of the 28-mm. size and 23 per cent of the 63-mm. caps.

The plight of the weakest woman in this comparison is indeed sad. She would be able to open all the 28-mm. rolled on screw caps, but would have no success with 57 per cent of the 28-mm. preformed screw caps. With 17 per cent of the rolled-on screw caps of 63-mm. size her efforts would be fruitless, and 47 per cent of the 63-mm. preformed caps would baffle her completely.

Progressive averages for the tests of a woman's strength were shown in the chart that accompanied the first article of this series. Similar progressive average curves for the twisting effort necessary to remove 28- and 63-mm. threaded caps have been prepared and appear on Figs. 2 and 3. From these curves it is apparent that the average twisting effort required for removing 28-mm. rolled-on screw caps is 47.4 per cent of that for preformed screw caps, or 6.35 inch-pounds for rolled-on, as against 13.4 inch-pounds for preformed. For 63-mm. caps, the final average twisting effort for rolled-on screw caps is 50.3 per cent of that for preformed screw caps, or 20.8 inch-pounds against 41.3 inch-pounds.

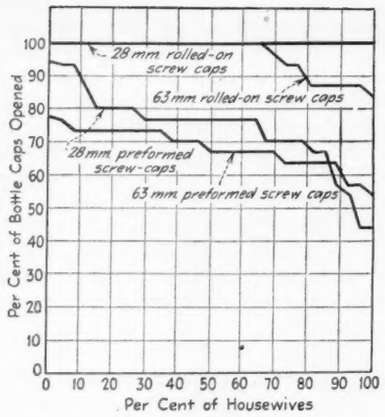


Fig. 4—Comparison of twisting effort that can be exerted by women and twisting effort required to remove caps, on a percentage basis.

Another way of expressing this comparison between the twisting effort that a woman can exert and that required to remove threaded caps is shown graphically in Fig. 4. Here separate curves are shown for each group of caps, plotted to show the percentage of caps that could be opened by any percentage of the housewives taking the test. From these curves a rating for each group of caps can be obtained by taking the area under each curve and dividing by the width of the area, which gives the average height. This figure represents the relative removability of the different sizes and groups of caps and works out as follows:

	Per Cent
28-mm. rolled-on screw caps	100
28-mm. preformed screw caps	74
63-mm. rolled-on screw caps	97.5
63-mm. preformed screw caps	68.3

These charts and percentages show, as clearly as laboratory figures can, just how successful women can expect to be when faced with the task of opening a screw-capped container with their bare hands. But the proof of the pudding is in the eating, and, if these figures are to be of value, we must also know just how a woman tackles the job of removing a screw cap. To determine this, the laboratory's investigators went into 50 kitchens and asked the women there each to open 10 containers capped with the closures under test. The results of the observations taken in these kitchens, and the conclusions drawn from them in conjunction with the foregoing tests, will be discussed in the third and final article of this series, in FOOD INDUSTRIES for May.

Table III—Mechanical Opening Tests of 63-Mm. Rolled-On Screw Caps

Cap No.	Packer	Product	Twisting Effort to Open, In.-Lb.	Sealing Medium
1	2	Mustard	40.5	
2	2	Mustard	24.8	
3	2	Mustard	23.6	
4	2	Mustard	41.3	
5	2	Mustard	37.5	
6	2	Mustard	30.0	
7	2	Mustard	17.6	
8	2	Mustard	27.4	
9	2	Mustard	37.5	
10	2	Mustard	15.7	
11	2	Relish	13.1	
12	2	Relish	16.1	
13	2	Relish	12.4	
14	2	Pickles	10.9	Coating Wax on Fibrous Paper
15	2	Pickles	10.1	
16	2	Pickles	11.3	
17	2	Mayonnaise	17.2	
18	2	Mayonnaise	28.5	
19	2	Mayonnaise	14.3	
20	2	Mustard	10.5	
21	2	Mustard	11.6	
22	2	Mustard	12.0	
23		Empty Jar	18.0	
24		Empty Jar	14.3	
25		Empty Jar	19.5	
26		Empty Jar	23.3	
27		Empty Jar	27.8	
28		Empty Jar	20.3	
29		Empty Jar	17.3	
30		Empty Jar	21.0	
		Average	20.8	

Table IV—Mechanical Opening Tests on 63-Mm. Preformed Screw Caps

Cap No.	Packer	Product	Twisting Effort to Open, In.-Lb.	Sealing Medium
1	23	Dressing	44.3	
2	23	Mayonnaise	34.3	
3	9	Mayonnaise	29.9	Wax Paper on Heavy Paper
4	23	Mayonnaise	23.6	
5	9	Mayonnaise	57.7	
6	23	Sandwich Spread	53.9	
7	17	Salad Dressing	29.2	
8	2	Mustard	13.7	Coating Wax Over Paper
9	2	Mustard	15.2	
10	14	Olives	104.9	
11	22	Olives	120.0	
12	4	Cheese	42.7	
13	4	Cheese	22.1	
14	4	Cheese	32.5	
15	18	Limburger Cheese	90.0	Wax Paper on Heavy Paper
16	18	Limburger Cheese	106.7	
17	7	Limburger Cheese	8.3	
18	7	Limburger Cheese	18.7	
19	4	Limburger Cheese	14.2	
20	4	Cheese	11.6	
21	4	Cheese	23.6	
22	14	Olives	12.0	
23	7	Limburger Cheese	9.8	Foil on Heavy Paper
24	17	Peanut Butter	19.5	
25	23	Dressing	26.2	
26	23	Dressing	55.5	Wax Paper on Heavy Paper
27	23	Sauce	15.8	
28	9	Mayonnaise	29.3	
29	9	Mayonnaise	28.5	
30	4	Cheese	39.0	
		Average	41.3	

Looking at the Fine Points Of Condensate Removal

By T. H. REA
Sales Engineer, Armstrong Machine Works
Three Rivers, Mich.

MOST food manufacturing plants use steam traps to drain steam-heated process equipment, yet many large plants are still wasting thousands of dollars worth of live steam because production executives fear that traps will increase cooking time or adversely affect the product itself. With competition growing keener, only the low-cost manufacturer will show a profit. This means that steam costs must kept at a minimum.

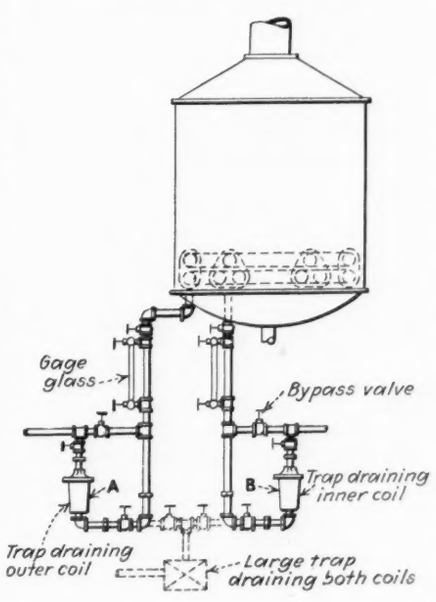
Based on experience with traps of the type made 25 years ago, the hostility toward steam traps may be justified. However, considerable progress has been made in steam-trap design and a modern trap of adequate capacity and proper operating characteristics will pass condensate and hold back steam without slowing down the cooking process or lowering the quality of the product.

The statement that traps will not slow down cooking time is based on thousands of successful installations. Furthermore, recent tests in a large packing plant demonstrate conclusively that adequate trap equipment will decrease cooking time below that obtained when cracked valves are used to pass the condensate. Fig. 1 is a diagrammatic sketch of a 1,000-gal. kettle or tank with which these tests were made. At the bottom of the kettle are two sets of copper coils, the outer consisting of two circular pipes of equal diameter and the inner of three circular pipes. The condensing surface of the two coils was about equal and each had an independent steam supply and drainage line. The object of the tests was to determine the time required to bring a certain quantity of cold water to the "break," or violent boiling point.

To check the performance of the traps, a test was made with the coils blowing to the atmosphere through a cracked valve. The time required to bring the cold water to the boiling point was 6 minutes and 19 seconds. When traps of ordinary size were used, nearly 8 minutes elapsed before the "break," but with larger traps having adequate air-handling capacity, the time was reduced to 6 minutes and 15 seconds, a saving of 4 seconds over the "straight blow through." With still larger traps the time was reduced to 6 minutes flat, which is a decided time saving over the test made without any traps. The difference in cooking time is due to the fact that the traps removed the air and water very rapidly but at the same time maintained maximum pressure, because no live steam could escape. With the cracked valve, there is bound to be a steam loss which will reduce the pressure and temperature of the steam and naturally slow down the cooking.

The possibility of close control over temperature makes steam an ideal medium for cooking food products. The temperature of saturated steam depends upon its pressure, which, in turn, is easy to maintain within close limits by means of suitable pressure control valves and other devices. For instance, steam at 100-lb. pressure will have a temperature of 338 deg. F. If the steam pressure drops to 90 lb., the temperature will be reduced to 331.4 deg. F. Thus it is that a straight blow through without traps is bound to reduce the temperature of the steam because the steam pressure will not be maintained at its maximum.

Fig. 1—Special set-up to compare methods of draining two cooking coils.



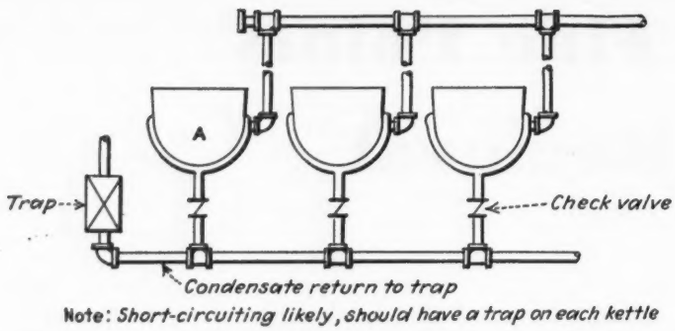
The presence of air or water in a steam condensing chamber, such as a jacketed kettle or cooking coils, will decrease the heat-delivering capacity of the unit. A cracked valve will allow the air and water to escape, but at the expense of a great steam loss. For instance, a $\frac{3}{8}$-in. diameter orifice will waste $9.20 worth of steam per day with steam costing 60 cents per 1,000 lb. If a fireman were to take $9.20 out of the cash register, he would be discharged and probably prosecuted for larceny. Is not management, then, equally guilty in allowing the unnecessary waste of steam to continue?

To obtain satisfactory results from a steam trap, the trap must be able to remove large volumes of air quickly and it also must have ample condensate capacity at low pressures.

Many traps with inadequate capacity have been installed on food-processing equipment because of failure to understand the operating conditions peculiar to the process. For example, a cooking coil may be rated to condense an average of 2,000 lb. of steam per hour at 125-lb. pressure. Accordingly a steam trap is installed having a continuous discharge capacity somewhat in excess of 2,000 lb. per hour when operating at 125-lb. pressure.

However, 125 lb. probably is the maximum working pressure. Most of the time not more than 100 lb. of steam may be available for cooking. Then when steam is first turned on and cold material surrounds the coil, the steam will condense at a very high rate and perhaps drop the pressure to as low as 50 or 60 lb. at the trap. Although the average rate of condensation may be only 2,000 lb. per hour, the initial rate may be 50 per cent greater. A trap that will handle 2,000 lb. per hour at 125-lb. pressure will handle only about 1,300 lb. at 60-lb. pressure, so what chance has the trap with steam being condensed at the rate of 3,000 lb. per hour? The line to the trap will be water-sealed and no air can escape. Hence the cooking process is delayed and the trap is condemned.

The proper way to select a trap for a cooking job is to determine the lowest as well as the highest working steam pressure at the trap. The highest pressure may be boiler pressure, but if the cooking equipment is located at some distance from the boiler room, the pres-



Note: *Short-circuiting likely, should have a trap on each kettle*

Fig. 2—A check valve is not a satisfactory substitute for a steam trap under these conditions.

sure drop will be considerable, and this should be allowed for in choosing the proper size of trap. The maximum—not the average—steam-condensing capacity of the coil or kettle should be determined, and *the continuous discharge capacity of the trap at minimum pressure should be twice the maximum load.* For the installation described in the preceding paragraph, the trap should have a continuous discharge capacity of 6,000 lb. per hour at 60-lb. pressure and yet be able to open at 125-lb. pressure. This extra capacity gives the trap a chance to handle the air when steam is first turned on as well as to remove the air as fast as it is introduced along with the steam.

The maximum operating pressure of a mechanically operated trap depends upon the size of the discharge orifice. The trap will work at any pressure below its maximum, but, of course, as the steam pressure goes down the capacity of the trap decreases. A mechanically operated trap will not open at pressures above its maximum, hence the importance of being sure that the operating pressure is high enough, even though this pressure may be reached only a few times per season.

In many cases the pipes that supply steam to kettles and coils are too small. Excessive pipe friction results and the steam pressure in the kettle or coil will be far below the steam-supply pressure. A 50-gal. kettle with a ½-in. steam inlet was connected to a 1½-in. steam line with 6 ft. of ½-in. pipe. With 40-lb. pressure in the supply line, the kettle pressure would drop to less than 10 lb. when the steam was first turned on. After installing 1-in. pipe between the kettle and supply line, the kettle pressure never was less than 35 lb. This increased pressure made higher steam temperatures in the steam space and greater kettle efficiency. A pressure gage on the discharge line from the kettle will show whether or not the pressure drop is excessive.

Traps should be installed close to the equipment that they drain. The size of the lines to and from the trap should be at least equal to the diameter of the trap connections. Since the capacity of any trap depends upon the orifice size and pressure drop across the orifice, it follows that pressure lost in the discharge lines directly decreases trap capacity. Therefore, avoid small lines and many fittings, as was demonstarted by tests made in a large canning plant and reported as follows: "When the No. —— trap discharged to an open retort through 15 ft. of 1-in. pipe and five ells, the discharge appeared to be continuous, but when the line was enlarged to 1¼ in., with only two ells, the trap intermitted very nicely, which indicates that enough back pressure builds up on account of the small diameter line, to actually reduce the capacity of the trap."

The same results cannot always be obtained from apparently indentical process units. Quoting from the report referred to above: "Simultaneous tests were made, using two kettles, one drained with a No. —— trap and the other kettle drained by means of a wide open valve. The water in the kettle equipped with a trap boiled nearly a minute sooner and 41 gal. of water was evaporated, as compared with 31 in the kettle that did not have a trap. Later, the test was repeated without a trap on either kettle, and the same results were obtained. This proves that a trap having adequate capacity and proper operating characteristics will not slow down the operation of jacketed kettles. Likewise, this demonstrates that there is a marked difference in the performance of apparently identical units. Therefore, when testing traps, it is not safe to make comparisons between two different kettles. Instead, test a single kettle both with and without a trap."

In draining process equipment, such as jacketed kettles or submerged copper coils, it is highly important to put a trap on each kettle or each coil. Referring to Fig. 2, if cold material should be put in kettle *A* when all the other kettles are hot and up to temperature, the pressure drop through kettle *A* would be materially greater than the pressure drop through the other kettles and hence steam from the common return line will enter kettle *A*. As long as this back flow of steam occurs, no condensate or air can leave the kettle. Installing a check valve on line from kettle *A* will not materially help matters, because as long as the differential in pressure exists, the check valve will remain closed and hold back both air and condensate.

These remarks apply equally to condensing coils of high capacity, even though the coils may be submerged in the same tank. Referring again to Fig. 1, a test was made draining the two coils with a single steam trap having very large capacity. A few seconds after the steam was turned on, water showed in the gage glass in the line leading to trap *A*. The reason for this is that, due to the circulation in the tank itself, the outer coil was condensing more steam than the inner coil, which caused a pressure drop, and the line to trap *B* was under higher pressure than the line to trap *A*. Consequently pressure in the line to *B* held back condensate in line *A* until the gage glass was entirely full, and it is quite likely that the water in line *A* rose even higher. The top of the gage glass was approximately 6 ft.

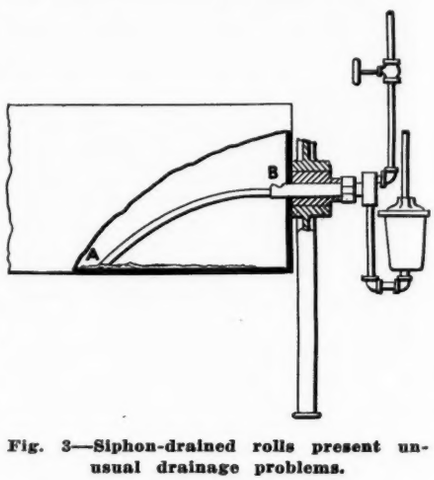


Fig. 3—Siphon-drained rolls present unusual drainage problems.

above the tee connecting the two lines, so the pressure differential must have been at least 3 lb., and as long as line *A* is filled with water, it is obvious that no air can escape from the outer coils.

Eventually enough air would accumulate in the outer coil so that this coil would condense no more steam than the inner one, and air should then drain out of the coil. Such a hook-up, however, limits the condensing capacity of the outer coil to the condensing capacity of the inner coil, which, of course, materially reduces the efficiency of the tank; the only way to prevent this is to install a separate trap on each coil.

Siphon-drained rolls, such as are shown in Fig. 3, present unusual drainage problems; first, on account of the very large volume of air to be handled, compared with the steam condensing surface; and, second, because flash steam formed in the siphon pipe will interfere with the trap operation. Before water will flow through the siphon pipe, the steam pressure at point *B* must be lower than the pressure at point *A*. As water rises in the siphon pipe, the

static pressure likewise is reduced. Thus there is a double pressure drop between *A* and *B*, and this rather sudden drop in pressure causes flash steam to form, which will close the trap even though the siphon pipe may be under water. Hence a trap for draining rolls of this type should have ample capacity for removing the air from the cylinder as well as for taking care of flash steam that is formed in the siphon pipe. When these precautions are taken care of, the draining of a roll of this type becomes no different from the draining of any other unit of similar size and steam-condensing capacity.

In conclusion, there is no reason why high steam costs in food-processing plants cannot be materially reduced without affecting either quality or quantity of production, provided traps are intelligently selected for a job. It is better not to install any trap at all than to try to "get by" with a trap having inadequate capacity or with one that is not suited for the operating conditions encountered. Production executives have had so much trouble with traps that are not at all suited for the job that the skeptical attitude is largely justified. This, however, should not prejudice them against modern equipment properly selected and installed which will reduce operating costs and enable the plant to show a profit even under highly competitive conditions.

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PACKAGING CONFERENCE PROVES BIG SUCCESS

PRODUCTION engineers, sales managers, and artists—about 6,000 of them—met at the Packaging, Packing and Shipping Exposition, held in New York during the week of March 7-10 under auspices of American Management Association.

An unusually large number of manufacturers displayed their containers, packaging materials and packaging machinery. And there was a second exhibit showing more than 200 modern packages, those entered in competition for the Irwin D. Wolf Award at the package exhibit held by National Alliance of Art and Industry from Feb. 20 to March 4.

Of the many interesting addresses, those by Laurence V. Burton, editor, FOOD INDUSTRIES; Francis Chilson, consultant and packaging editor, *The Drug and Cosmetic Industry;* and Roy Sheldon, president, Industrial Design, were of special interest to manufacturers.

In his address, "Production Problems Which the Sales Department Must Consider in Packaging," Mr. Burton stated in part:

"Frequently there is a tendency for sales departments and designers to overlook the fact that the actual production of packages is not done in the sales office—not in the studio—but in some factory, and usually on automatic or semi-automatic machinery.

"Packaging as a function is comparable to a three-legged stool in which the production division of a manufacturing establishment is one of the legs. Overemphasis or underemphasis on any feature of packaging, be it design, materials or production, is the equivalent of having one leg of a three-legged stool either too long or too short. If that were to happen our stool would lose much of its utility and, if we carry the parallel over into the field of packaging, we might have a package that was too costly, too fragile, ineffective, impossible of mass production, lacking in sales appeal or disappointing from any one of a great variety of aspects."

Mr. Burton cited many examples of avoidable losses that occurred because the production department had not been consulted on new package designs, and he brought out the point that final authority on packaging should not be delegated to the sales department but should be placed very close to the top of the company organization.

Mr. Chilson talked on the subject, "Economics in Packaging," saying in part:

"The interests of a production man are paramount because they are not necessarily inimical to the interests of anyone else. The package is, first of all, a production unit.

"I think that the term 'consumer convenience' has been greatly overemphasized. When the product requires extraordinary provisions for preservation, the consumer uses the package without complaint. No consumer objects to the sardine can because it is neither particularly sightly nor easy to open.

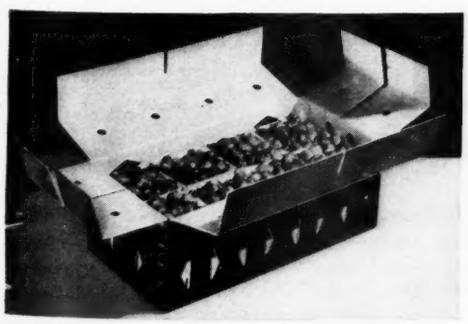
"The prime requisite in a package is that it shall be amenable to mechanical production methods."

Mr. Sheldon discussed "The Reduction of Packaging Costs Through Simplification of Package Design," and the following is an excerpt from his address:

"A broad opportunity to make large and permanent savings is through the standardization of packages. The 'family resemblance' in packages is based on a fundamental design treatment. Besides making the manufacturer's identity stronger, it eliminates a multiplicity of designs and frequent change. If carried too far, however, the family resemblance can become monotonous."

A number of other addresses at the conference dealt with subjects of interest to manufacturers. Among these were "Manufacturers' Advertising and Sales Promotion Policies," by L. D. H. Weld, McCann-Erickson, Inc.; "How May the Manufacturers' Pricing Policies be Improved?" by Paul T. Cherington, distribution consultant; "Case Studies in Packaging, Packing and Shipping," by Frank C. Chase, assistant superintendent, E. R. Squibb & Sons; "Recent Developments in Package Machinery," by Roger L. Putnam, president, Package Machinery Co.; H. H. Leonard, vice-president and general manager, Consolidated Packaging Machinery Corp., and C. E. Schaeffer, Stokes & Smith Co.

Two food packages and a shipping container which won honorary Wolf awards. Below, "Gairpac," the best shipping case. Center, Royal Jewel Coffee, the best paper bag. Right, Gnome Cranberry-Rye Bread, the best visible display package.



Motor Truck Transportation in

THESE two pages are devoted to the important subject of motor transportation in the food industries. Each month fundamental phases of motor transportation will be discussed. Companies represented by readers of FOOD INDUSTRIES own motor equipment costing tens of millions of dollars and approximately an equal amount to operate yearly.

● It is therefore evident how important it should be to keep abreast of all developments in the field to protect the enormous investment involved. A continuous striving should be maintained to discover new, better and cheaper methods.

● There is almost unanimous agreement as to the results to be obtained, but many differences of opinion as to the manner of accomplishment. So if the readers of these pages do not always agree with the deductions drawn from the fundamental facts presented, their views are cordially solicited for discussion in these pages or by correspondence.

Refrigerated Truck Bodies In the Food Industries

MOTOR transportation of perishable products in the food industries has been greatly aided and in some cases made possible by the comparatively rapid development of refrigerated truck bodies. They, however, are still in their infancy. Greater strides may be expected within the next few years toward the development of the ideal refrigerated truck body.

Much of the pioneering already accomplished has been done by the ice cream industry since the general acceptance of the mechanically refrigerated iceless cabinet. Practically every proposed method of refrigeration has been employed on ice-cream transport and delivery vehicles. Many of these methods have been found suitable for bodies designed to carry meat, milk, fish, fruits, vegetables, dough, yeast, ice cream mix, butter, cheese and similar products.

The fundamental problems of portable refrigerating equipment are the same, regardless of the products handled. Low cost, light weight, operating economy, freedom from service failures and ability to maintain the desired temperatures are essentials of the ideal refrigerated truck body. Refrigeration is necessary to overcome temperature losses due to the opening of the body doors and heat leakages of the body itself. The most efficient body design, construction and insulation are required.

It is probable that no one ideal refrigerating system will be found to meet all conditions. This will be due to the great variance in the temperatures required for the food products handled.

Future development of the refrigerated truck body may be looked for in the closer control and maintenance within smaller limits of whatever temperatures are required; improvements in present systems and the introduction of new ones; improved refrigeration practices before the products are placed in the refrigerated truck bodies and a wider application of the refrigerated body in all fields where ordinary ice is now used.

Perhaps the most important of the improvements will be the greater control of body temperatures, although this will result from other improvements. With mechanical refrigeration, temperature control by automatic devices has been satisfactory when simplified in action and rugged enough to withstand truck and road vibration.

Bodies using solid CO_2 as a refrigerant have left much to be desired in temperature control. Considerable improvement was made during the past year by increasing the absorption area in contact with the solid CO_2 hopper.

Better temperature control has been obtained also by reducing the temperature of the product to be hauled to the desired degree before putting it into the truck body. This has lessened the burden on the truck refrigerating means to simply keeping the goods at the proper temperature while in transit.

Ice-cream manufacturers have gone to hardening-room temperatures as low as —25 deg. F. Ice cream has been loaded into route truck bodies as low as —10 deg. F. Lowering of ice cream temperatures before loading was done to reduce the amount of refrigeration required in the body itself and to be certain that any ice cream which had to be brought back would not be too high in temperature. Ice cream does not soften uniformly across the cross-section of the can. It softens first around the circumference, with the center still very cold. If the outer ring reaches 10 deg. F., undesirable ice crystals begin to form.

Saving Gasoline by Gas Analyzers

THE growth of the use of exhaust-gas analyzers has indicated great possibilities for saving fuel used by the large fleets of motor vehicles in the food industries. The exhaust-gas analyzer tells whether the fuel and air fed to the engine carburetor are mixed in the proper proportions.

The device may be had in one or more types. Several gasoline companies offer the free use of such instruments to their accounts.

With mounting gas taxes, no means to make the gasoline dollar deliver the greatest returns should be overlooked.

Paper Ice Cream Cans Have Certain Advantages

PAPER ice cream cans are now being tried out in actual service to determine if they offer a means of reducing selling expense in which delivery costs are an important item. From a weight standpoint they have a distinct advantage of approximately 33 per cent. Six hundred gallons of ice cream in metal cans weighs 3,960 lb.; in paper cans, 2,760 lb., a net reduction of 1,200 lb.

the Field of the Food Industries

Tests so far made indicate that paper cans, being of inert composition, require more truck-body refrigeration area than do metal cans. The paper absorbs less heat and moisture from the air in the truck body, which therefore requires a greater bunker area.

Other advantages of the paper can include the elimination of can loss; the handling of return empties; can washing and sterilizing and the necessary equipment; and the storage and handling of metal cans. Prints on the paper cans offer advertising possibilities. The use of paper cans stops bootlegging by the inability to refill.

Although the paper can is much cheaper in first cost, it rides only once, while the metal can is used many times. The paper can also sets up a dealer reaction to change of custom; is harder to handle on conveyors; is harder to serve from in the cabinet; and is difficult to remove from the cabinet when frozen to the bottom.

Driver Bill Talks With His Boss

HOW a motor truck driver and his employer came to a better understanding is told in a small, four-page pamphlet entitled "Bill and the Boss." It's written in a breezy, conversational style and points out the moral that the truck owner and his drivers are really partners in transportation. When drivers consider themselves as such through proper training by their employers, they can do many things to reduce truck operating costs to a marked extent.

The booklet is a plea for better driver training. Its appeal is to executives in charge of truck transportation work. Single copies may be had free and in quantities at 2 cents each from the Motor Truck Committee of the National Automobile Chamber of Commerce, 366 Madison Ave., New York, N. Y.

Daily Mileage Run Affects Costs of Delivery Trucks

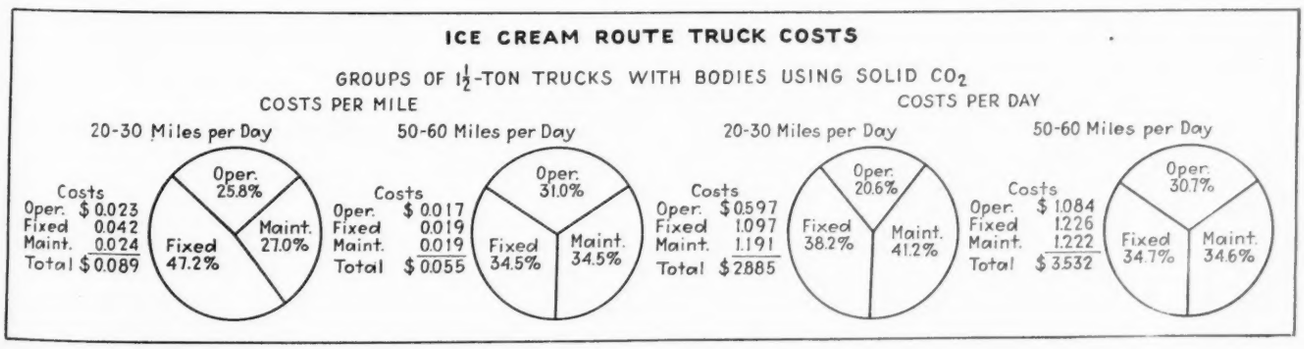
COST charts given at the bottom of this page indicate the necessity of grouping the costs according to the daily mileage run whenever an attempt is made to compare costs effectually of route delivery trucks in the food industries. The daily mileage affects the truck costs per mile, and per day, to such an extent that, unless the costs are grouped upon some mileage basis, comparisons will be valueless. For example, the per-mile cost for the typical truck selected varies from $0.089 when operated on a 20-30 mile route to $0.055 when the identical vehicle is operated on a 50-60 mile route. This is a spread of $0.034 per mile, or approximately 38 per cent. In a similar manner, the cost per day increases from $2.885 to $3.532, a spread of $0.647, or 22 per cent.

Increased or decreased costs do not vary directly in proportion with the changes in daily mileage run, because the fixed charges remain constant, irrespective of the mileage run. Although the most accurate comparisons possible would be those between like groups of trucks which averaged exactly the same daily mileage, the difficulty of obtaining such a condition in actual practice has led to the more convenient grouping of the mileages between certain limits. In the figures given there is a spread of 10 miles in each of the two mileage groups indicated. With other factors remaining constant, the smaller the mileage group spread the more accurate will be the comparisons made.

Rules for Comparisons

No attempt should be made to compare the costs given with the reader's own costs unless the trucks are of the same make and the cost figures are developed in exactly the same manner. In the charts, "Oper." designates operating charges consisting of fuel, oil and tires; "Fixed" designates fixed charges consisting of depreciation at 25 per cent; licenses, taxes and all forms of insurance but no interest on investment; "Maint." designates maintenance charges consisting of all direct labor and material for mechanical repairs and body repairs and painting; indirect or service labor; miscellaneous supplies and repair and paint shop overheads and supervision. It is to be noted that no drivers' salaries, operating supervision or garage rents are included, since these fluctuate so radically in different parts of the country.

Operating charges vary proportionately with the mileage run. Maintenance charges also vary proportionately with the mileage run, provided the figures cover a period equal to that in which a major overhaul is made. Otherwise the unit maintenance costs may be extremely low for the first year of the truck's depreciated life and extremely high for the third or fourth year. The figures given in the charts below cover a period of only one year.



The Effect of Daily Mileage on Truck Costs

THE EFFECT of daily mileage on route delivery-truck costs is clearly shown in the typical cost figures given above. The greater the daily mileage, the less is the cost per mile and the greater is the cost per day. It is therefore evident that for effective comparisons between makes and types of trucks used in route delivery work, the costs must be grouped within certain daily mileage ranges. The costs above given, while taken from actual cost data, cannot be used for direct comparison without consideration of other operating conditions and the method of building up the truck-expense items. Please refer to the text of the article above for a further discussion of the value of the cost figures shown.

BOOK REVIEWS

TEMPERATURE AND HUMIDITY MEASUREMENT AND CONTROL. By F. M. Behar. Published by Instruments Publishing Co., 3619 Forbes St., Pittsburgh, Pa., 1932. 320 pp., 6x9¼; 278 illustrations; cloth. Price, $4.

HERE is a handbook that answers the engineer's cry for practical information on two scores. It describes available industrial instruments for measuring and controlling temperature and humidity, and it formulates principles of measurement and control. It is a worthy contribution to engineering literature. Food manufacturers will be particularly interested in the section on humidity, and they will find of value those discussions under thermometry which deal with low-temperature measurement and control.

Although the book is primarily a description of industrial instruments and their applications, advantages and limitations, it also contains general discussions of those phases of instrumentation under consideration and gives important definitions, formulas and charts. This treatment enables the reader to understand the operation of the instruments and to appreciate the complexity of the problems of measurement and control.

Much of the material is from instrument manufacturers, but the author has contributed a goodly amount and he has done a commendable job of compiling available information. The book is filled with practical material and is written in a style that makes it readable. In it the author has combined Parts II and III of his Manual of Instrumentation.

* * *

COLLOID CHEMISTRY, THEORETICAL AND APPLIED. Vols. III and IV. Edited by Jerome Alexander. Published by Chemical Catalog Co., Inc., 419 Fourth Ave., New York, N. Y. Vol. III, 1931; 655 pp., 6½x9¼; cloth; price, $10.50. Vol. IV, 1932; 734 pp., 6½x9¼; cloth; price, $11.50.

THESE two volumes, devoted to a series of papers on technical applications of colloid chemistry, conclude this ambitious collection of colloidal chemical information. The first volume, published in 1926, dealt with Theory and Methods, and Vol. II with Biology and Medicine.

In Vol. III the chapters of interest to food techonologists are: Colloid Mills and Comminution Chemistry, by August Chwala; The Super-Centrifuge in Industry, by Edward M. James; and The Colloid Chemistry of Wheat, Wheat Flour, and Wheat Flour Products, by Ross A. Gortner.

Of the 42 chapters in Vol. IV, nine pertain to the food industries. Colloid Chemistry in the Sugar Industry is discussed by R. T. Balch and H. S. Paine; Applied Colloidal Chemistry in Confectionery Manufacture, by Stroud Jordan; A Summary of the Colloidal Chemistry of Starches, by Max Samec; Starch and Some of Its Derivatives, by Victor G. Bloede. Of less direct interest to food men is the chapter entitled "Technologically Useful Properties of Casein," by Frederick L. Browne.

Colloidal Aspects of Baking Chemistry, by Charles N. Frey and Quick Landis; Butter and Margarine From the Standpoint of Colloid Chemistry, by William Clayton; Colloidal Chemistry and the Art of Beer Brewing, by Fritz Emslander; and The Pectic Substances, by Ruth Johnstin and Mary A. Griggs, complete the food group.

Each chapter is a treatise on the subject by a recognized authority in his field and is concluded with a bibliography of the pertinent literature.

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ADVERTISING ALLOWANCES. By Leverett S. Lyon. Published by the Brookings Institution, 26 Jackson Place, Washington, D. C., 1932. 125 pp., 5½x8¼; cloth. Price, $1.

INITIATED to encourage retailers of food products particularly to feature the name or trademark of the manufacturer in their advertising, these allowances have gradually become a source of price reductions and in some instances of ill-gotten gains for purchasing agents. It has been estimated that only about 25 per cent of the advertising allowances granted by manufacturers has been spent by the recipients for advertising. Therefore, it seems very much in order to bring this subject out into the open. Thus manufacturers in general may work out plans, separated from distinctly classifiable selling terms and representing payments for specific promotion performances, which are possible, practicable, and capable of being audited.

The author has obtained his material for this book from a host of authoritative sources, principally in the food field, including manufacturing, wholesaling, and retailing associations, to say nothing of wide reading of published material, and has set forth his subject in a very convincing manner. Published under the auspices of the Brookings Institution, this volume gives the reader information which has weight and authoritativeness on one of the worst trade practices in use today.

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REFRIGERATION. By James A. Moyer and Raymond U. Fittz. Second Edition. Published by McGraw-Hill Book Co., 330 West 42d St., New York, N. Y., 1932. 538 pp. 6¼x9¼; cloth; 292 illustrations. Price, $5.

TO MEET the demands for wider knowledge on the developments in refrigeration and to make their book as nearly up to date as possible, the authors have fully revised their 1928 edition. They have added new chapters and expanded others to cover applications of quick-freezing, production of solid CO_2, methods of controlling refrigerants, revised data on the properties of refrigerants, and other developments, including new small-capacity absorption plants and the silica-gel refrigerating system.

The chapter on quick-freezing is not as complete as one would expect to find in a book of this kind. The dismissal of a subject which has become so prominent with a 6-page discussion is explainable by saying that the process is so new that there is a wide difference of opinion on what takes place during freezing and how the freezing shall be done.

Solutions to case problems in both refrigeration and air-conditioning and a 34-page appendix devoted to charts and tables of data give the book an additional value as a reference book to the practical engineer.

* * *

THE CONSUMER: HIS NATURE AND HIS CHANGING HABITS. By Walter B. Pitkin. Published by McGraw-Hill Book Co., Inc., 330 West 42d St.. New York, N. Y., 1932. 421 pp., 6¼x9¼; cloth. Price, $4.

IT WOULD seem that no one had given Mr. Consumer any credit for a great amount of mental activity until Walter Pitkin came along with this study. Economists have been prone to overlook the fact that the consumer is human—only too human—and have made no attempt to take him apart to see what makes him react as he does. Past researches have been broad economic surveys, primarily, in which the consumer was regarded as the mass mind which, if you will, was moved into action by mass appeal.

Psychologists, too, have passed Mr. Consumer by. Many lengthy treatises have been written on the abnormal and subnormal man—all pathological cases. A psychological study of the normal man, as he goes through his 24 hours of day and night, of eating and sleeping, of working and playing, would be a worth-while-reading contribution to those interested in people as markets. Prof. Pitkin develops an interesting and original concept along these lines, termed the "web of life," which will bear thorough consideration.

This book is of vital importance to every food manufacturer because a greater share of the consumer's dollar still goes for food than for any other commodity. Also, the annual food consumption does not vary greatly, as food manufacturers are selling to an unusually stable market. What, then, accounts for changing tastes; for the variance in seasonal demand?

A new approach to this oft-asked question is disclosed in Prof. Pitkin's "web of life" concept, which is the stimulating theme embodied in this book.

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Books Received

THE ENGINEERING ASPECTS OF THE CONDENSING AND DRYING OF MILK. By A. W. Scott. Bulletin No. 4, Hannah Dairy Research Institute, Kirkhill, Ayr, Scotland. 4s. 9d., postpaid.

THE PROPERTIES OF MILK, IN RELATION TO THE CONDENSING AND DRYING OF WHOLE MILK, SEPARATED MILK, AND WHEY. By L. A. Allen. Hannah Dairy Research Institute, Kirkhill, Ayr, Scotland. 4s. 9d., postpaid.

WHAT IS TECHNOCRACY? By Allen Raymond. Whittlesey House, 330 West 42d St., New York, N. Y. $1.50.

ABSTRACTS OF CURRENT LITERATURE

BREWER'S YEAST. Kotaro Nishida. *Bulletin of the Chemical Society of Japan,* Vol. 8, pp. 14-22; January, 1933.

Spoilage of yeast by putrefaction was an object of study even among early workers in this field, Hesse in 1857 and Mueller in 1859; and a number of the products of putrefaction have been known for many years. But identification of products as a key to the process of putrefactive spoilage has not hitherto been carried far enough. A new study has been made and several newly identified nitrogenous products are reported. Previous investigations had revealed ethyl, trimethyl, isoamyl and caprylamines, sepsine, hypoxanthine, histamine, putrescine, cadaverine, tyramine and leucine as coming from putrefied brewer's yeast. It has now been found that phenylethylamine and adenine also are among the products, thus increasing somewhat the complexity of the process, which was already known to be far from a simple decomposition.

* * *

THE EFFECT OF THE ELECTROPURE PROCESS OF TREATING MILK UPON BACTERIAL ENDOSPORES. A. J. Gelpi, Jr., and E. D. Devereux. *Science,* Oct. 28, 1932.

The great effectiveness of the Electropure process for pasteurizing milk in destroying resistant endospores is due, according to these authors, not only to the heat created in the medium surrounding these endospores but also to the heat generated within the endospores themselves. This heat probably is greater than that of the surrounding medium.

* * *

BONE ASH OF RACHITIC RATS. C. A. Lilly. *Proceedings of the Society for Experimental Biology and Medicine,* Vol. 30, pp. 175-176; November, 1932.

The importance of an adequate mineral supply in the reconstruction of rachitic bones has not been sufficiently stressed in the past. The addition of disodium hydrogen phosphate in adequate quantities to a low phosphorus rachitogenic diet produces a bone ash comparable to the bone ash produced by adding pure vitamin D to such a diet.

* * *

MANUFACTURE OF TABLE SYRUP FROM RAW CANE JUICE. C. A. Coppin. *International Sugar Journal,* Vol. 34, p. 404 (1932). [From *British Chemical Abstracts,* B, p. 1049; Dec. 2, 1932.]

Raw cane juice is limed to about pH of 6.0, heated, clarified in the usual manner, evaporated to about d. 1.21, acetic acid added, and the syrup heated under pressure at 150 deg. C. for 1 hour at pH of 4.5. After inversion, it is settled, and evaporated to about d. 1.39, when the polarization should be 30-35 deg.

THE TREATMENT OF RACHITIC INFANTS WITH MILK PRODUCED BY COWS FED IRRADIATED ERGOSTEROL. H. J. Gerstenberger and A. J. Haresh. *Journal of Nutrition,* September, 1932.

Vitamin D enriched milk from the same two cows used in the experiment reported on p. 65 (*F. I.,* February) was given to two rachitic infants over periods of ten and eleven weeks, respectively. The formula used consisted of 500 cc. of the special milk and 55 cc. of ordinary skim milk, with added lactic acid and carbohydrate. Orange juice also was given. The infants received only so much fat daily as is found in a pint of milk and was equivalent in vitamin D content to half a teaspoonful of cod liver oil. At the end of the experimental period, when the babies were removed from the hospital against the advice of the physicians, both cases showed nearly complete healing. The conclusion reached that the milk has definite but not great curative powers may be explained by the fact that the infants received only half as much of the activated milk as did cases in other experiments where more successful results were obtained.

* * *

SPICES AND CONDIMENTS. Antonio Ceriotti. *Ediciones de la Sociedad Nacional de Farmacia* (Buenos Aires), 1932; 23 pp.

Vegetable spices and condiments are commonly classified as *aromatic* (examples: cloves, anise, nutmeg and saffron), *acrid* (examples: pepper and ginger), and *alliaceous* (examples: onions and garlic). But with the knowledge now available concerning chemical composition and its relations to properties of plant products, classification according to their active principles (examples: essential oils, glucosides, alkaloids and the like) is considered more logical. Taste, odor, appetite stimulation, antiseptic effect, aid to digestion and other properties depend on these chemical principles; hence a chemical classification is best for many purposes. Condiments derived from many sources and from many parts of plants, including seeds, flowers, flower heads, fruits, leaves, roots, bulbs and rhizomes, are cited as examples. A general outline of the chemical composition and analysis of spices and condiments is given. Individual descriptions are included for savory, sweet basil, capers, anise, star anise, celery seed and saffron. These descriptions characterize the specified spices according to their macroscopic and microscopic physical appearance, taste, odor and chemical composition. Numerous chemical tests for identification are described, and the importance of microscopic examination is emphasized as a means for identifying components of blends and detecting contamination, fraudulent adulteration and inferior quality.

CONTRIBUTION TO RESEARCH ON EGGS. K. Eble, H. Pfeiffer and R. Bretschneider. *Zeitschrift für Untersuchung der Lebensmittle,* Vol. 65, pp. 100-104; 1933.

A chemical method of distinguishing fresh from old or preserved eggs consists of detecting the presence of phosphate ions in the egg white by a colorimetric reaction. An appreciable quantity of such ions indicates an old or preserved egg. To carry out the method, 2 c.c. of egg whites and 8 c.c. of freshly distilled water (which must remain colorless in a blank test) are mixed with 5 c.c. of hydroquinone solution (20 grams of hydroquinone in 1,000 c.c. of distilled water with 1 c.c. of concentrated sulphuric acid) and 5 c.c. ammonium molybdate solution (25 grams ammonium molybdate dissolved cold in 500 c.c. of phosphorus-free N sulphuric acid). After five minutes 25 c.c. of bicarbonate solution is added (1,000 c.c. of 20 per cent sodium carbonate solution made from anhydrous sodium carbonate, 250 c.c. distilled water and 37.5 grams sodium sulphite). All solutions must be preserved in tightly closed brown glass bottles. Eggs two or three weeks old give no color or only a very slight green, while older eggs, whether preserved or not, give a blue-green to a deep blue color. The color should be observed by transmitted light.

* * *

DETERMINATION OF VITAMIN A. K. H. Coward, F. J. Dyer and R. A. Morton. *Biochemical Journal,* Vol. 26, pp. 1593-1600 (1932).

The quantitative determination of vitamin A in cod liver oils, (*a*) biologically, (*b*) chemically, and (*c*) physically, shows that the intensity of absorption of light at wave length of 328 gives the best measurement of the vitamin A value of the oil.

* * *

HEAT STABILITY OF VITAMIN B. C. A. Elvehjem and others. *Journal of Biological Chemistry,* Vol. 99, pp. 309-319; December, 1932.

Vitamin B_1 in yeast and in a natural ration was destroyed completely by autoclaving and inactivated to a large extent by heating moist at 100 deg. C. for 24 hours. The rate of destruction of vitamin B_1 in the presence of moisture was decreased with increase of hydrogen ion concentration. The inactivation of vitamin B_2 in a natural ration depends upon the length of time of heating. Dried baker's yeast lost half its potency of vitamin B_2 after heating dry for 144 hours.

* * *

CAROTENE AND VITAMIN A. H. Goldblatt and H. M. Barnett. *Proceedings of the Society for Experimental Biology and Medicine,* Vol. 30, pp. 201-204; November, 1932.

Carotene has been adopted as a temporary international standard for vitamin A potency. Considerable difference has existed among the values of carotene in terms of the Sherman unit of vitamin A. Further work has not explained these extreme variations of values, but results do show that 1 international unit of vitamin A may be considered as equivalent to 2 Sherman units.

NEW PRODUCTS
NEW METHODS

Soup in Powder Form

No longer need the housewife use a can opener to prepare soup. She can now purchase it in a dry form, getting six to eight generous servings from a pasteboard package no bigger than one's hand. This unusual form of soup is the product of Pure-A Foods, Inc., Penn Yan, N. Y. The manufacturer makes it from vegetables, meats and cereals. The process involves methods of predigestion and includes the milling of flour, the refining of fats and meats, the blending and mixing of a variety of products, such as wheat, potatoes, peas and beans. To put the vegetable products in powdered form, of course, necessitates vegetable drying.

The result of all these operations is scientifically dry-processed food held to retain the vitamins, mineral salts and other

natural elements. A general percentage analysis of a typical Pure-A dry soup follows: fats and meats, 15; peas, beans or special ingredients, 65; vegetables and milk, 12; salt, spice and condiments, 8.

The soups are made in several varieties, such as green pea, cream of celery, yellow split pea and cream of potato. The packages contain 3¾ oz., and the contents are prepared for the table by adding water.

"Flashed" Orange Juice

Another attempt has been made by a canner to capture that elusive natural quality of fresh orange juice. Hills Bros. Co., New York, recently put a "Dromedary" canned orange juice on the market. The company processes the orange juice by the same "flash" method employed for Dromedary grapefruit juice. The details of this process are kept secret, but its name is descriptive of what it entails. With this method the juice enters the cans 3 minutes after being squeezed from the fruit.

Another Dromedary development is a redesigned coconut package, a step in keeping with the plan to convert all Dromedary packages to a uniform design. And this product is now being wrapped in transparent cellulose to keep it fresh.

The accompanying illustration shows the new orange juice can and depicts the evolution of the coconut package.

Multi-Wall Paper Flour Bags

Having established themselves in Canada, multiple-wall paper flour bags with sewed ends and a patented filling valve are being introduced into the United States. As used in Canada, the paper bag has a 98-lb. capacity and is of four-wall construction. The walls are of heavy kraft paper and are joined with a reinforced cushioned seam at the end, each wall taking its proportionate share of the load. A 49-lb., three-wall bag also has been used by the millers, and a 24-lb., two-wall bag made of bleached kraft paper has been developed for flour sold direct to retailers.

These valve bags are filled through a paper sleeve that opens into one corner, the sleeve being tucked in after filling. To fill the 98-lb. sacks, a two-tube automatic machine has been adopted. This machine employs two tapered screws fed at regular intervals by a preweighing scale. When the load for one bag has been weighed out, an automatic deflector directs the next to the other screw. This filling machine is equipped with a settler that jolts the bag while the flour is pouring into it.

By minor adjustments the machine used for filling 98-lb. bags can be made to accommodate 49-lb. units. The 24-lb. bags are filled by a newly developed machine that can also handle the 49-lb. units. The bags and machines are the development of the St. Regis Paper Co., 60 East 42d St., New York, N. Y.

The following advantages are attributed

to the paper bags: automatic packing, imperviousness to foreign materials and moisture, elimination of sifter in bakery, protection against mold and "rope," low initial cost, ease of opening, complete discharge of contents, no loss due to sifting in transit.

Cottage Cheese in Cans

No longer is cottage cheese strictly a bulk article. Sodus Cooperative Creamery Co., Wolcott, N. Y., now packs it in tin containers. This method of packaging is credited with many advantages. It obviates spoilage caused by atmospheric conditions, and it also keeps the product sanitary. It permits extension of distribution and provides a package distinguished by the manufacturer's trademark, increasing its sales appeal and allowing it to be backed by advertising. Then, of course, canned cheese facilitates counter or shelf display in the store. The cheese is vacuum packed in cylindrical tins that are opened by a key.

Sausage in Cloth Bags

Prepared and packed by the new "cold control" method, Swift Brookfield Sausage carries much of the original delicate flavor and the "old-fashioned-country-sausage"

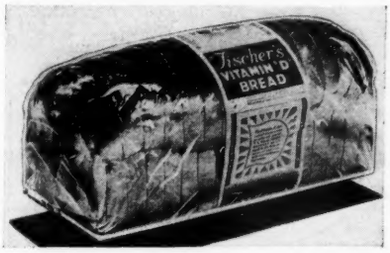
taste. And, to make it convenient, this pure pork sausage is wrapped in parchment paper and then put into cloth bags, 1 lb. to the bag. Blue lines scored on the bags enable the cook to slice a roll into thin

patties without removing the cloth, thus retaining the unused portion of the sausage in its own wrapper. The parchment paper remains on the patties until serving time, holding them to their smooth, round shape.

Something different in the way of packing sausage is also being carried on by Armour & Co. It is putting out a combination liver-and-bacon sausage cased in 2-lb. units.

Visible Vitamin D Bread

Believing that a quality product deserves a distinctive dress, Fischer Baking Co., Newark, N. J., adopted a transparent cellulose wrapping for its new vitamin D bread. And the sales appeal of the product has been so great that total sales of the company, which is the third largest independent bakery in the country, have jumped about 15 per cent.



Vitamin D is introduced into the Fischer bread by the Zucker-Columbia University process, which involves the addition of vitamin D concentrate from cod-liver oil. Each 18-oz. loaf contains more of vitamin D than two teaspoonfuls of standard cod-liver oil. The bread retails at 10 cents a loaf.

Exposes Berries on Six Sides

With a recently developed method of packing strawberries, the berries have no more privacy than a bowl of goldfish. Known as the Elkin Pack method, the new way of handling the berries calls for wrapping them completely in transparent cellulose before placing them in the pint or quart boxes. This enables the purchaser to take them out in her hand and see the berries at the bottom and sides of the box as well as those on top.

Aside from its strong sales appeal, the cellulose wrapping keeps the berries in better condition, retaining much of the field freshness and flavor. Then, too, it prevents dirt from collecting on them while in the store. DuPont Cellophane Co., Inc., New York, inaugurated the Elkin Pack.

Potato Chips Are Dated

Potato chips have entered the ranks of dated foods. Through its Widlar division, Standard Brands, Inc., is distributing dated chips in the Cleveland market. These are packed in a glassine bag with a transparent cellulose window which bears a sizable red seal with the words: "Guaranteed fresh until April 10," or whatever date is necessitated by the time of packaging.

An important function of this package is that it keeps the salt separate from the chips until the bag is opened. Folds at

the top of the bag contain the salt, and it shakes down upon the chips when the bag is opened.

The chips are being retailed in three sizes at 5, 10, and 23 cents, respectively. If they meet with the expected acceptance they will be introduced throughout the country.

Log Cabin With Logs

Log cabins should look as if they were made from logs, and the General Foods Corp., New York, acquired that effect in its can of Log Cabin Syrup by redesigning it. "Logs" extend all the way around the

can and the ends "project" at the corners. Cartoons, which are changed from time to time, depict life in the cabin and give it a re-use value in the children's playroom. The company reports increased sales.

He-Man's Reindeer Confection

In the good old days reindeer meat was a food used by hardy pioneers, hunters and explorers, these men obtaining their supply from the hoof. Now the product is retailed as a "he-man's confection." A deer-meat delicacy known as Deerkie is packed in glassine bags by Reindeer Products Co., Seattle, Wash. A similar product called Jerkie is produced by Gelsinger's, Glendale, Calif. Both are distributed on the Pacific Coast, and Deerkie is being introduced into the Middle West. Shortly it will be available over the entire country. A small and a large package sell for 10 and 25 cents, respectively.

The reindeer meat is butchered in Alaska, frozen and shipped to the packing house. Only the hams of the deer are used, and these are sliced and cured in a special spiced salt and sugar brine. The meat is then drained and placed in a large dehydrating oven heated to a high temperature. The heat is gradually tempered down and held at a certain temperature until the product is properly dried. Before the meat is completely dehydrated, it is given a special natural smoke treatment, to instill a fragrant tang. This method of treatment is the one described by Reindeer Products Co. A similar process is used by Gelsinger's.

Combines Honey and Butter

By combining two common, healthful foods, honey and butter, International Honey-Butter Corp., Cleveland, has produced a new product—Vitagold Honey and Butter. And Wieland Honey-Butter Corp., Oak Park, Ill., licensee of the former company, produced the new "butter confection" until conditions in the butter market caused the manufacture of the product to be temporarily halted. The Wieland company had

distributed Vitagold in the Chicago market and had put it on the milk wagons of several dairies in that area. These dairies found it particularly useful as a "lead" product; it opened the door to new business.

Vitagold contains 50 per cent honey and 50 per cent butter. The honey being a simple and natural sugar, the honey-butter affords an energy supply and vitamin content valuable in the daily diet.

White Soybean Flour Made

Soybean flour of a new type is being produced by American Soya Products Corp., Evansville, Ind., a subsidiary of Mead Johnson & Co. It combines whiteness with a complete absence of the characteristic disagreeable soybean odor and flavor, the company reports. The patented process of manufacture removes all but 1.7 per cent of the oil from the soybean. The protein content is 68 per cent.

The flour, called "Nusoy," is finely ground and may be used in white bread and other baked goods, in sausage, bologna, wieners, macaroni and other products where water absorption and retention are important. When used in bread, 2 to 3 per cent increases the protein content of the bread appreciably. And the bread has a good appearance, is tasty and remains fresh unusually long. For diabetic bread, the baker uses Nusoy to the extent of 9 per cent with gluten flour to give an almost starch-free loaf containing double the protein content of ordinary white bread. The high absorption ability of the flour effects a 10 per cent increase in the number of loaves, it is asserted.

Nusoy is sold in 100-lb. bags.

MEN, JOBS AND COMPANIES

INDUSTRY

BORDEN Co. has merged all its associated companies in Greater New York, forming Pioneer Ice Cream Brands, Inc. All the present trademarks will be retained, with the possible exception of Anheuser-Busch and Dairy Made, it is reported. Madison H. Lewis, formerly president of J. M. Horton Ice Cream Co., Inc., New York, N. Y., is head of the new company. The consolidation is an economy measure.

BORDEN SALES Co., Chicago, has developed a new process of making American cheese without the use of an emulsifier. This method, similar to that recently announced by Kraft-Phenix Cheese Corp., permits the word "processed" to be omitted from the label. Borden is distributing its new product only in Chicago at the present time, but it will be introduced on a nation-wide scale if it meets with favorable acceptance. Its introduction is backed up by an intensive advertising campaign.

CANADA DRY GINGER ALE, INC., New York, has formed a new subsidiary which will act as manufacturers' agent and wholesaler of ales, wines and hard liquors when these beverages are legalized. The new subsidiary, known as Canada Dry Sales & Import Co., also will import and distribute bottled beer brewed by Würzburger Hofbräu Brewery. August Lüchow, Inc., will handle Würzburger beer in barrels.

DEHYDRATED FOODS CORP., New York, is planning to erect dehydrating plants in California and in the East. It is the company's belief that the dehydrating industry will expand until it rivals the canning industry.

FIRCH BAKING CO., INC., Erie, Pa., recently acquired the William Freihofer Baking Co., of the same city, through a merger. J. B. Dwyer, president of the Firch company, is president of the new concern and William J. Freihofer has been made a director. The manufacturing operations of both bakeries will be done in the Firch plant.

JOHNSON EDUCATOR FOOD CO., Cambridge, Mass., has opened a branch factory in Toronto, Canada, to be operated under the name of the British Educator Biscuit Co., Ltd. The plant occupies space leased from Crosse & Blackwell, and its equipment is all of advanced design. "Toasted Cheese Thins" is the company's feature line at present. George Burry, Toronto, is president.

KROGER GROCERY & BAKING CO., Cincinnati, has budgeted $2,100,000 for new construction and the purchase of automotive, manufacturing and other equipment during 1933. This represents an increase over 1932.

NATIONAL CHEESE PRODUCERS' FEDERATION, at its annual meeting at Plymouth, Wis., reelected F. W. Huntzicker, of Greenwood, Wis., president. W. A. Hutter, Spring Green, was chosen vice-president, and R. B. Melvin became secretary-treasurer. A. H. Lauterbach and R. B. Brown remained general manager and sales manager, respectively.

NATIONAL CONSUMERS' LEAGUE, New York, has discontinued its "white list." This list was composed of 115 candy manufacturers who maintained a minimum wage of $14 a week for factory help. This scale was maintained for five years and was abandoned because of the pressure of competition.

C. I. POST
Promoted by National Oil Products Co.

PINEAPPLE PRODUCERS' COOPERATIVE ASSOCIATION, LTD., San Francisco, has been delegated the control of canning and marketing of the produce of the Hawaiian pineapple interests for the next ten years. The cooperative will regulate the stocks of all its members.

TACOMA BREWING CO., San Francisco, formerly one of the largest brewing concerns on the West Coast, came to life recently and filed articles of incorporation as the Pacific Brewing & Malting Co. Its capitalization is placed at $2,000,000. The concern will take over the Tacoma Bottling Co. plants at Sacramento and Los Angeles, and the Fredericksburg Brewery and Malt House at San Jose.

UNITED PRUNE GROWERS has just begun the second part of the national advertising campaign on California prunes. Billboard posters will be put up in 28 cities and towns and 150,000 more recipe books will be ordered and distributed.

WINNIPEG, Manitoba, is the proposed site of a fully modern 1,500-ton sugar refinery, and capital to the amount of $750,000 is being sought to double a similar amount put up by Dutch interests. The proposal also hinges upon a guaranteed supply of beets. It is reported that Werkspoor, Amsterdam, large manufacturer of sugar-making machinery, is largely responsible for the venture.

PERSONNEL

NATHAN BLISS, of the Jersey-Meadow Gold Co., Inc., Brooklyn, has been transferred from Baltimore to New York to take charge of the mechanical cabinet and transportation departments. Mr. Bliss has had long experience in this work at Baltimore.

R. B. BLUME has been appointed general superintendent of the dairy department, general office, of the Kroger Grocery & Baking Co., Cincinnati. Other changes in personnel made recently by Kroger involve the appointment of R. R. GRAY to general superintendent of the cake department; A. G. HARMEIER, to general superintendent of the Cincinnati factory; R. F. LOVELL to general superintendent of the cracker and cookie department; J. McKINNEY to general superintendent of meat packing department; and J. A. McMILLAN to general superintendent of the coffee and tea department. All of these men are located at the general office.

ROLAND J. CLARK resigned March 1 as chief chemist for Schulze Baking Co., Kansas City, after six years in that capacity. Before taking over the Schulze laboratory, Mr. Clark was with Goerz Flour Mill Co., Newton, Kan., as a chemist. Previous to that he served Campbell System, Inc., Kansas City. Mr. Clark has been an active member of the milling and baking trade association, being president of American Association of Cereal Chemists in 1925-26 and a member of the American Society of Baking Engineers. He left Schulze because the laboratory was closed.

HUGH P. FELL, formerly in charge of production engineering and cream sales for Dry Milk Co., has been moved to the manufacturing department of Borden's Food Products Co., Inc., where he is assistant superintendent of the construction and equipment section. Mr. Fell had been with the Dry Milk Co. since 1919.

ADRIAN M. KELLY, who is connected with Shattuck-Schrafft-Wallace, candy manufacturers, is believed to be slated for the post of director of the Bureau of Foreign and Domestic Commerce.

GEORGE KEMERICKS, factory executive of E. J. Brach & Sons, Chicago, is now head of the production department of A. Bonomo, a Brooklyn confectionery manufacturer. Mr. Kemericks served Brach & Sons for about a year and a half. Previously, he was connected with other confectionery firms in the East.

LOWELL B. KILGORE, who served for two years as a research fellow for Mayonnaise Manufacturers' Association, did not work at Mellon Institute, as was reported in this column last month. His fellowship work was at the Bureau of Chemistry and Soils.

FRED LAZARUS, JR., vice-president and treasurer of F. & R. Lazarus & Co., dry goods firm of Columbus, Ohio, has been elected a director of Kroger Grocery & Baking Co. to succeed Paul Sims, of New York, who resigned. All other directors and officers of the Kroger company have been reelected.

OGDEN L. MILLS, Secretary of the Treasury under President Hoover, was recently made a director of National Biscuit Co., New York.

WALTER PAGE has been elected vice-president of Borden's Milk Products Co.,

Inc., Borden Southern Co., Borden Co. of Pennsylvania, Borden Co. of Texas and Maricopa Creamery Co., Inc. These companies are all subsidiaries of Borden's Food Products Co., Inc. Previously, Mr. Page had charge of production in these companies.

ARTHUR O'KEEFE, formerly sales manager of First National Stores, Inc., Boston, Mass., has been elected president of the company to succeed the late C. H. Farnsworth. Mr. O'Keefe is the son of the first president of the First National organization, M. O. O'Keefe, and has been actively engaged with the company since its formation about eight years ago. At that time there was a merger of Ginter Co., John T. Connor, Inc., and M. O. O'Keefe.

F. D. PARKER, superintendent of Borden Western Co., has gone to the company's plant at Corona, Calif., temporarily leaving the plant at Fayetteville, N. Y. He will supervise the Corona plant, which produces Merrell-Soule Powdered Lemon Juice. Mr. Parker spends one-half to one-third of his time at Corona, and in June he will return to Fayetteville.

C. I. POST, chemist, has been appointed manager of the Vitex department of National Oil Products Co., Harrison, N. J. Mr. Post has been associated with National Oil Products since 1925, serving successively as chief chemist, manager of the Chicago office and manager of the tanning oil division. In his new position, he will be in charge of the licensing of bakeries and dairies which use the company's vitamin D concentrate in bread or milk.

E. R. ROOT, Medina, Ohio, has been chosen president of American Honey Institute, and D. D. Stover has been made vice-president. The secretary-treasurer is Mrs. M. F. Jensen, Madison, Wis.

P. J. SUNDHEIM, formerly assistant production manager of National Biscuit Co., New York, has been named to assist James R. Henry, assistant manager of the production department at the company's Western headquarters. Assisting the managers in the Western headquarters will be I. Harrison Trowbridge, sponge varieties department; John J. Toomey, sweet and iced goods department; and Herman L. Dobson, packing department.

WILLIAM B. TRAYNOR, vice-president and director of Swift & Co., Chicago, has been elected treasurer of the company to succeed the late L. A. Carton. Mr. Traynor entered the employ of Swift & Co. in New York in 1901. He was appointed assistant to the president in 1916, was made vice-president in 1928 and a director in 1932.

DEATHS

THOMAS BURTON, retired superintendent of National Sugar Refining Co., Yonkers, N. Y., died March 12 after an extended illness. Mr. Burton was 60 years old and was a native of England.

LAURENCE A. CARTON, for 40 years treasurer and director of Swift & Co., Chicago, died recently at the age of 87. Mr. Carton was born in Ireland, coming to this country in 1851. He entered business in Chicago at the age of 18 and became a banker and commercial paper broker. In 1893, he was influenced by Gustavus F. Swift to join Swift & Co. as its treasurer, becoming a director shortly afterward. Mr. Carton helped to determine the financial policies upon which Swift & Co. expanded.

WALTER A. DIXON, 68, former vice-president and general manager of Great Western Sugar Co., Denver, died March 21 of a heart attack. He retired from business 15 years ago.

JOHN FARR, vice-president and a director of Central Aguirre Sugar Co. and long a prominent figure in the sugar industry, died early last month at his country home in Scarborough, N. Y. He was 74. Mr. Farr helped to develop the Cuban American Sugar Co. and Central Aguirre Associates.

WILLIAM V. HAMILTON, 73, president of William Hamilton & Son, flour millers, Caledonia, N. Y., and president of New York State Flour Millers' Association for the last 20 years, died March 6 of injuries received in an automobile accident.

WILLIAM B. TRAYNOR
Elected treasurer of Swift & Co.

AUSTIN H. HILLS, president of Hills Bros., San Francisco coffee roasters, died March 1. Mr. Hills, with his brother, R. H. Hills, founded the coffee company in 1878. His brother continues management of the business.

JOHN HONOLD, for 58 years a brewmaster at the Rising Sun Brewery, Elizabeth, N. J., died March 13 after an illness of six weeks. He was born in Germany 74 years ago.

JOHN F. KING, supervising architect of Premier-Pabst Corp., Peoria, Ill., died recently in Milwaukee after a week's illness. Mr. King, who was 64, had been with the Premier company for two years.

MALCOLM PARKER, who founded Parker Vanilla Products Co., Inc., Baltimore, Md., in 1917, died March 1, sixteen years to the day from the date on which he founded the vanilla company. His death was a result of nerve paralysis. Mr. Parker was also a member of the William Haigh Co., Baltimore, a wholesale flavor manufacturing house.

WILLIAM F. VAN ALSTINE, 53, manager of Western Pure Foods, Ltd., Winnipeg, Manitoba, died recently after a protracted illness. He had been engaged in the food manufacturing business for 33 years. He was manager of White Star Manufacturing Co. when that business was reorganized to form Western Pure Foods, Ltd.

FRANK D. WILSON, president of Wilson Bros., flour and feed brokers, and president of Gateway Milling Co., Buffalo, N. Y., died recently after a brief illness. He formerly was branch manager for Washburn-Crosby Co., Utica, N. Y.

ASSOCIATED INDUSTRIES

AMERICAN CAN CO., New York, N. Y., has been experimenting with fiber containers for fresh milk, and if these experiments prove successful, the company may organize a division to handle this new business.

BLAW-KNOX CO., Pittsburgh steel manufacturer, announces a complete service in the design and manufacture of brewhouse equipment. The company has become affiliated with Weigelwerk A. G. of Germany and can supply brewing equipment tried and tested in Europe.

JOHN M. CARMODY, formerly editor of *Factory and Industrial Management* and president of the Society of Industrial Engineers, has taken a position with Wallace Clark & Co., Graybar Building, New York, N. Y. The Clark company serves industry as industrial engineers and as a liaison agent with European industry.

WILLIAM W. DODGE, recently resigned as managing editor of *Product Engineering* and, after a month's service as representative for a group of industrial artists and designers, has established himself as an adviser and consultant on product and package design. His office is at 330 West 42d St., New York, N. Y.

GENERAL AIR CONDITIONING CO., INC., has recently been formed with offices at 155 East 44th St., New York, N. Y., to offer complete engineering service in the design and installation of industrial air-conditioning, air-cooling and drying systems. M. Hitchen and A. H. Clogston, both formerly with Cooling & Air Conditioning Corp., are president and vice-president, respectively.

MASON REGULATOR CO., 1190 Adams St., Boston, Mass., has adopted the trademark "Masoneilan" for its temperature-, pressure-, flow- and combustion-control instruments. This trademark will be used also by the Neilan Co., Ltd., a division of Mason Regulator Co.

OTTAWA RIVER PAPER CO., Toledo, has appointed W. H. Walker Eastern representative with headquarters at 67 West 44th St., New York, N. Y.

PATTERSON FOUNDRY & MACHINE CO., East Liverpool, Ohio, announces the appointment of Sheldon Engineering Co., Toledo, Ohio, as district representative for the Toledo territory.

FOSTER D. SNELL, 130 Clinton St., Brooklyn, N. Y., announces a chemical specialties information service and will furnish small specialty manufacturers with an analytical check-up on products.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO., East Pittsburgh, Pa., has appointed H. M. Wible manager of the commercial cooking and refrigeration division, combining the cooking and refrigeration divisions in one department.

BUSINESS TRENDS

Tomato Juice and Beet Sugar Production Increases

In the face of a general downward trend in food production last year, tomato juice packers and beet sugar refiners greatly increased their activities, according to the Bureau of Foreign and Domestic Commerce. Reports from 161 tomato juice canneries show an output for the group of 3,824,457 cases of all sizes. The year before, only 2,956,887 cases were packed. This group represents 86 per cent of the total production in 1931 of 3,441,205 cases. If the entire industry increased its output at the same rate, a total 1932 pack of 4,450,000 cases is indicated.

Beet sugar refiners closed the 1932-33 season with a new all-time record for production with 1,206,486 long tons. This puts the United States in first place in the world's beet sugar industry for the first time in history. Germany ranks second, while Russia and France are about tie for third.

Following the more general downward trend, the canning of green and wax beans slowed up last year. The 1932 pack of green beans amounted to 3,453,477 cases, as compared with 4,871,271 cases in 1931, a drop of 29.5 per cent. The pack of wax beans fell off 50.8 per cent, totaling 588,097 cases, as against 1,195,820 in 1931.

Activity in the cottonseed mills of the country also was at a slower pace. The quantity of cottonseed crushed in the seven months from Aug. 1 to Feb. 28 aggregated 3,449,450 tons, compared with 4,074,743 tons for the same period a year ago.

BASIS FOR THE CURVES

Retail food prices, factory employment, factory payrolls and wholesale prices are based on indexes of the Department of Labor. Cost-of-living index is that of the National Industrial Conference Board. Electrical power consumption figures are furnished by *Electrical World*.

Prices Fluctuate

• Business, bewildered and bedeviled by the happenings of the past three years, takes on a more cheerful attitude. Prompt and decisive action has characterized the first three shuffles in the "New Deal" and has given rise to a conviction that better times are coming.

• Cold statistical facts are not so enthusing. *The Business Week* Index of general business activity stands at a new low of 47.2 per cent of normal for the week ending March 18. This index is greaty influenced by the bank holiday's continuance in some districts.

• Commodity prices turned definitely upward until the middle of March, then turned as definitely downward, indicating that buying power is still lacking. Wholesale prices reported by U. S. Department of Labor show net increases of 0.5 per cent for all commodities, 3.58 per cent for farm products and 0.92 per cent for food during the month ending March 18. The *Journal of Commerce* weighted index of prices give net increases of 2.27 per cent for all commodities, 15.16 per cent for grains and 3.38 per cent for foods during the month ending March 25.

• Effect of colder weather on retail sales of food is indicated by the 9.36 per cent increase in A. & P. tonnage sales during the short month of February over January. Tonnage sales for February, 1923, were only 1.61 per cent less than for February, 1932.

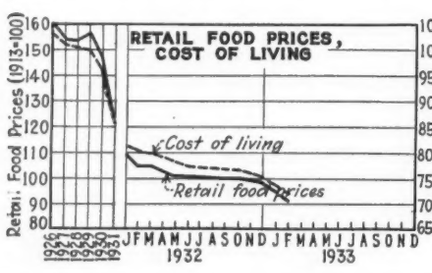
Movement of Food Affected By Financial Crisis

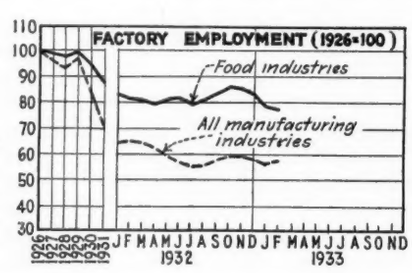
When the week-long bank holiday began, on March 6, activity in the food industry was upset all the way from the producer to the retailer. The meat trade probably was the most seriously affected. Packers had no means of paying for raw material. Commission merchants were without cash to provide bond. Farmers hesitated to sell when they could have neither cash nor liquid checks in payment. Eventually, arrangements were made to pay for livestock by checks payable when the holiday ended. And subsequently, Secretary of the Treasury Woodin ordered that funds be made available for dealing in foodstuffs, including livestock. With this, markets returned about to normal.

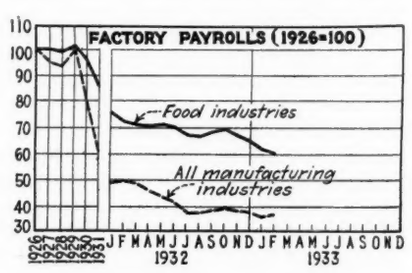
During the first four days of the holiday, receipts of hogs at the twelve principal markets totaled 282,800, as against 309,300 a week earlier. Prices of live hogs rose to the highest point in six months, receding later in the week. Prices of meat to the consumer remained fairly steady except for fresh pork cuts, the price of which rose temporarily as a result of shortage.

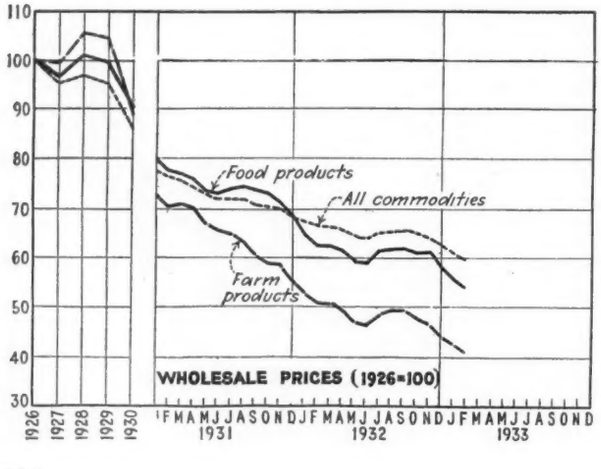
In the canned goods market, jobbers and wholesalers severely curtailed activities during the first part of the holiday, and consumer buying hit a peak as many people decided to lay in supplies of food. This situation changed when funds for food movement became available and when the tension eased among the buying public. However, large quantities of canned fruits, vegetables and fish were sold.

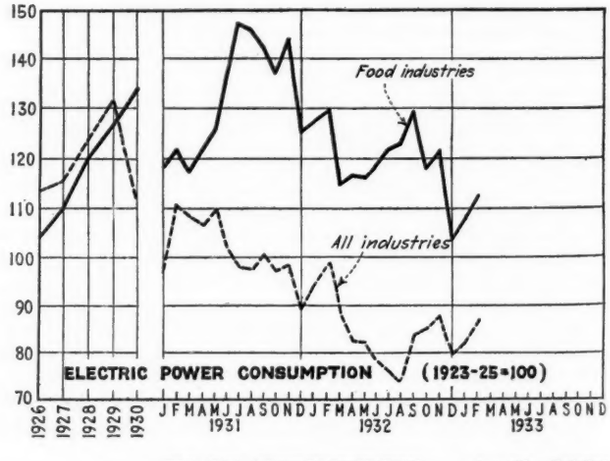
The dairy industry in general functioned about as usual, although many consumers delayed payment of their milk bills. And in some instances the dairy farmers were hard pressed financially when they could not convert their milk checks into cash.


RETAIL FOOD PRICES, COST OF LIVING
Retail Food Prices (1913=100)
Cost of Living (1923=100)
Cost of living
Retail food prices
1926 1927 1928 1929 1930 1931
J F M A M J J A S O N D J F M A M J J A S O N D
1932
1933


FACTORY EMPLOYMENT (1926=100)
Food industries
All manufacturing industries
1926 1927 1928 1929 1930 1931
J F M A M J J A S O N D J F M A M J J A S O N D
1932
1933


FACTORY PAYROLLS (1926=100)
Food industries
All manufacturing industries
1926 1927 1928 1929 1930 1931
J F M A M J J A S O N D J F M A M J J A S O N D
1932
1933


WHOLESALE PRICES (1926=100)
Food products
All commodities
Farm products
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932
1933


ELECTRIC POWER CONSUMPTION (1923-25=100)
Food industries
All industries
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932
1933

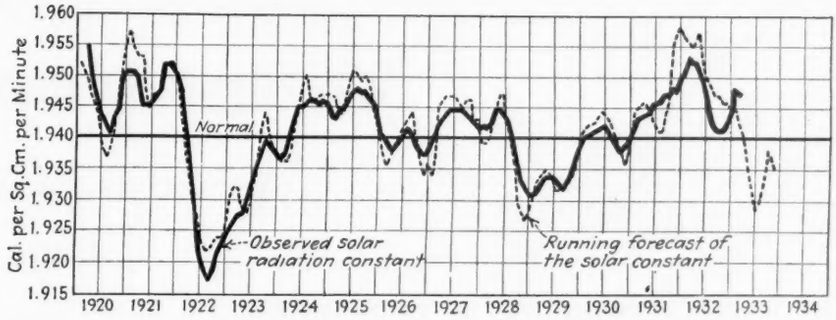
Canadian Canning Industry Shows Notable Trends

Significant developments have taken place in the Canadian canning industry within the last year. Imports of canned vegetables into Canada in 1932 totaled 3,081,624 lb., as against 8,424,603 lb. in the preceding year. And exports of canned fruits and vegetables rose from 12,259,341 lb. in 1931 to 18,037,059 lb. last year. Canned pears accounted for nearly half the exports of fruit, while two-thirds of the vegetable exports were of tomatoes.

As to production, the output of canned fruits of all kinds rose from 784,833 cases in 1931 to 1,272,334 cases in 1932, while the pack of vegetables and soups of all kinds declined from 7,248,381 cases in 1931 to 5,411,562 cases last year. These figures include over 95 per cent of the total production.

Compared with the previous year, the pack of apples was between three and four times as large; that of pears, more than twice as large; and there were large increases in the output of cherries, peaches and plums. The quantities of raspberries and strawberries canned were below those of 1931.

Canning of tomatoes, peas, beans and corn, and the production of canned soups represent the outstanding activities of the Canadian vegetable packing industry. The feature of 1932 operations, however, was the large increase in the output of tomato juice, which rose from 177,656 cases in 1931 to 310,340 cases last year. Production of canned soups showed only a very slight decline at 1,017,566 cases. Largest decreases were in packs of corn and tomatoes, the former being down from 1,396,529 to 419,827 cases and the latter from 2,193,297 to 1,431,638 cases.



Solar Radiation Nears End of Hot Phase?

No other force exerts so tremendous an influence as weather on the production and sale of food. But what makes weather? It is believed by many that the non-seasonal changes of weather—the extremes of heat or cold—are tied up with variations in the character of solar radiation. Measurements of the latter, made daily by the Smithsonian Institution, show extremes of variation of as much as 2.5 per cent from high to low. This is quite a lot when it is recalled that its significance must be interpreted on the absolute scale of temperature, because the temperature of interstellar space is almost down to absolute zero—about—490 deg. F.

The daily observations of solar radiation are averaged for the month and the curve presented on this page shows the march of these monthly means from 1920 when the first dependable measurements were made. The solid black line is a "smoothed" curve made by taking 5-month moving averages of all the observations. The dotted line is the forecast line, made by recombining the seven component periodicities into which the solid line has been analyzed by the periodometer. It shows a fairly close "fit."

Of great interest is the forecast of a downward trend of solar radiation in 1933, which is expected to be a repetition of the big dip of 1922 except that the dip will perhaps be shallower and longer.

Make your own guess as to what it will signify as to weather, or crop production in your own and competing lines. Will it mean that the spring will be late? Will the fresh-vegetable-growing areas of the Imperial Valley, the Rio Grande or Florida freeze up next winter? Write out your guess, date it, witness it, then file it and watch events.

Normal radiation is considered to be 1.940 calories per square centimeter per minute. The following are the monthly means for the past half year: September, 1.937; October, 1.940; November, 1.940; December, 1.945; January, 1.948; February, 1.947.

Storage Holdings of Meats Show Big Decline

Hopeful conditions prevail in the outlook for meats in that the supplies of pork and beef on hand have decreased. Storage holdings of pork as of March 1 amounted to only 610,000,000 lb., compared with 812,000,000 lb. a year ago and a five-ycar average of 856,000,000 lb. As for beef, cold-storage holdings are the lightest in several years, being 36,000,000 lb., as against 51,000,000 last year at the same time and a five-year average of more than 73,000,000. This decline is phenomenal in that the number of hogs on farms increased 3 per cent during 1932 and the number of cattle rose 4 per cent.

Conditions are more favorable also for lamb. Reports for the first part of 1933 place the number of lambs on farms at 8 per cent less than at the same time last year, although factors are somewhat more favorable to their growth.

Another factor favorable to the packing industry is a decline in beef slaughter in Argentina during 1932. The number of cattle killed in that country declined 1.6 per cent and the slaughter of cattle at freezing and chilling plants dropped 3.6 per cent. However, hog killings increased 10.9 per cent.

The most unfavorable development in the meat industry is the increase in the German import duty on lard from $1.08 to $5.40 per 100 lb. Through it, a serious barrier has arisen to America's largest lard market. In cured pork, the foreign market situation is not so unfavorable. Indications are that under the present British import quota system, more American cured pork may be accepted than was taken in recent months.

Indicators

ACREAGE reductions are planned this spring in many crops, the Crop Reporting Board believes. The following percentage cuts are predicted: durum wheat, 23; corn, 3.5; rice, 13; sweet potatoes, 13; potatoes, 5.4.

CASHEWS are gaining in popularity, outselling almonds, for example, 25 to 1. They have made a large gain since last October, and, based on present sales, consumption this year will amount to more than 10,000,000 lb.

VOLUNTARY grocery chains increased in number by 27 per cent in 1931, according to American Institute of Food Distribution. The number of groups was 700 in 1931, compared with 551 the year before, while membership totaled 80,000 stores, as compared to 59,640 in 1930.

CANNED SOUPS are being produced by more companies, in greater volume and in more varieties than ever before. Recent additions to the line include clam chowder by Phillips Packing Co., Inc., Baltimore, and cream of mushroom and clam chowder by H. J. Heinz Co., Pittsburgh.

SELLING at a loss means suicide to most manufacturers. Proof of this lies in the fact that three or four times as many mayonnaise manufacturers have gone out of business in the last two or three years as there are manufacturers now in business.

SUGAR dollars are worth only a few cents to the refiner. Each dollar paid by the consumer for sugar produced in Cuba and refined in the United States contributes 37.5 cents to the U. S. Treasury, 25.6 cents to the Cuban producer, 24.6 cents to the jobber and retailer and only 12.3 cents to the refiner. These figures are from the 1932 annual report of American Sugar Refining Co.

FISHERY products frozen in the United States last year were 18 per cent less in volume than for the year before, totaling 92,472,000 lb., the Department of Commerce reports.

"WITH China and Japan having large crops of rice this year, rice exporting countries of southeastern Asia will find it necessary to sell a larger percentage of their exportable surpluses in European countries in competition with American exports," the Bureau of Agricultural Economics states.

THIS MONTH—

APRIL

3-4—Bakery Sales Promotion Association, annual meeting, President Hotel, Atlantic City, N. J. Frank J. Nemetz, secretary, 1135 Fullerton Ave., Chicago, Ill.

8-10—Specialty Bakery Owners of America, annual meeting and exhibition, Chateau de Luxe Hall, New York, N. Y. Jacob Walters, secretary, 189 Second Ave., New York, N. Y.

18-19—Rocky Mountain Bakers' Association, annual meeting, Albany Hotel, Denver, Colo. J. H. Winchell, secretary.

22-29—New York, Pennsylvania and Potomac States Bakers' Associations, annual meeting and cruise to Havana, Steamer "Oriente," New York, N. Y. L. A. Schillinger, 595 Madison Ave., New York, N. Y.

26—American Dry Milk Institute, annual meeting, Chicago, Ill. Roud McCann, director, 221 North La Salle St., Chicago, Ill.

3-8—New York Food and Health Exposition, Grand Central Palace, New York, N. Y. Earl G. Thomas, managing director, 444 Madison Ave., New York, N. Y.

26-28—Twentieth National Foreign Trade Convention, Pittsburgh, Pa. Sponsored by National Foreign Trade Council and called by its chairman, James A. Farrell, Chamber of Commerce, Pittsburgh.

Hors d'Oeuvres

MAYONNAISE manufacturers have profited about as much as the banks from the change of tenants in the White House. Introduced in the Senate restaurant on inauguration day, the Roosevelt Salad has taken the country by storm. By any other name, the salad would have tasted like any other concoction of commonplace vegetables.

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NOW that the hot-cha properties of tea have been "discovered" and proclaimed to the public, we see it all. We refer to what that advertising expert meant when he said his profession believed the average intelligence of the public to be that of a 13-year child. Babies will swallow anything, too.

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THESE food trade meetings are becoming more and more interesting. The cruise to Havana is pretty fair, but now comes an announcement of a bathing beauty contest. It's scheduled for the retail grocers' convention at Atlantic City in June. Manufacturers represented at the exposition are invited to bring their favorite beauty. Be careful; you might lose her.

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EXPERIMENTS by English scientists have shown that a lecithin diet increases the thickness and length of hair on rabbits, dogs and pigs. It has not been tried on bald business men, but perhaps it also will grow grass on a boneyard.

•

NOW that beer is available—non-intoxicating beer—the question is, what will play left-handed accompaniment to the stein—pretzels or potato chips. Manufacturers of both are preparing for a big business.

What Food Men Are

Brewers go into action—Simplified Tomato standards—Anti-trust in 24 hours—Vitamin D

BEER became legal sooner than anyone expected, and now the brewers are feverishly engaged in brewing, bottling and barreling the 3.2 per cent amber fluid. Despite all efforts to meet the demand that will spring into being at 12:01 a.m. on April 7, a shortage is predicted. Available brewing capacity totals about 25 million barrels a year, compared to a 65-million barrel consumption in 1918, according to a survey made in cooperation with members of United States Brewers' Association. When national prohibition went into full effect in 1920, 1,100 breweries were in operation. Now there are only 164 operating under federal permit.

Many of the pre-prohibition breweries have been converted into cold-storage warehouses, dairy plants and what not, and many more have remained inoperative until their equipment has deteriorated. This means that millions will be spent for rehabilitation and for new equipment. According to L. Seth Schnitman, chief statistician of F. W. Dodge Corp., more than $65,000,000 will be spent within the next few months. The estimate is based on reports from 37 states east of the Rockies and on statistical calculation for the Far Western states. Taking expenditures for the retail end of the business into account, the United States Brewers' Association has placed the total at $400,000,000.

The Cullen beer bill, signed March 22 by President Roosevelt, provides for 3.2 per cent beer and wine (by weight); levies a tax of $5 a barrel (31 gal.); prevents interstate shipment of beer into a prohibition commonwealth; taxes each brewery $1,000 annually; requires wholesalers and retailers to take annual permits at $50 and $20 each, respectively; allows advertising by all methods; places the burden of proof on brewers as to alcoholic content; denies licenses to breweries operating illegally during prohibition; establishes as import duties those in the Smoot-Hawley Act; and leaves to the states all regulatory and control methods.

According to Federal Attorney Medalie's prohibition division, the bill makes home brew illegal, even though it does not exceed 3.2 per cent in alcoholic content. This belief is based upon a sentence in Section 3 of the bill which makes the act applicable to beer contained in barrels, casks, bottles or kegs which have not been labeled and sealed "as may be prescribed by regulation."

The bill may please the brewers, but the wine growers speak of the 3.2 per cent wine provision with deep disgust and sarcasm. Prof. F. T. Bioletti, of the University of California, an authority on wines, says that the only way to produce 3.2 per cent wine is to take perfectly good wine and spoil it by adding twice as much water. Then it would not keep without being pasteurized or treated with benzoate.

GRADED PEAS henceforth will be classified as small, medium or large. These are the three general classifications of a simplified practice recommendation which the Department of Commerce is now submitting to the industry for acceptance. The following tables give the recommended sieve sizes:

SWEET VARIETIES

Designations	Limiting Conditions
Small (1 and2)[1]	Peas which pass through 10/32-in. opening.[2]
Medium (3 and 4)[1]	Peas which pass through 12/32-in., but not 10/32-in., opening.[2]
Large (5 and 6)[1]	Peas which do not pass through 12/32-in. opening.[2]

ALASKA TYPE VARIETIES

Designations	Limiting Conditions
Small (1 and 2)[1]	Peas which pass through 10/32-in. opening.[2]
Medium (3)[1]	Peas which pass through 11/32-in., but not 10/32-in., opening.[2]
Large (4 and 5)[1]	Peas which do not pass through 11/32-in. opening[2].

[1]Old size number. [2]Before blanching.

The purpose of the simplification is to limit the regular lines of stock items, placing others in the class of specials. If accepted, the recommended sizes become effective May 1. National Canners' Association initiated the simplification, and the plan was adopted at the annual convention of the association.

BAKERY engineers and members of industries allied to the baking trade take problems of their profession more seriously than those of banks. Despite the currency shortage early in March, 452 members attended the tenth annual meeting of the American Society of Bakery Engineers at Chicago, March 13-16.

A number of interesting and educational reports were given. Harry E. Weaver, chief chemist, Kansas Flour Mills Corp., and C. H. McIntosh, chemist, C. J. Patterson Corp., showed that sponges have much greater tolerance than most bakers thought. Their paper, "Sponge and Dough Conditioning," pointed out that there was little difference between bread from a three-hour sponge and that from a seven-hour sponge, the same flour and formula being used.

Likewise, the research committee's re-

Doing and Saying

pea sizes—Bakery engineers meet—decision—Must land salmon—Commissions reduced

port, "Shortening in French Bread," upset a general belief by showing that best results are obtained with 5 to 10 per cent of shortening.

Carlos S. Pickering, the association's new president, and F. Smith Norton gave dimensions for the ideal pan in their report, "The Effect of Pan Shapes on Loaf Characteristics." They found the ideal pan to have 5.83 cu.in. of pan space per ounce of dough and to have the following dimensions: top (inside), 9x5 in.; bottom (outside), $8\frac{13}{16}$x$4\frac{5}{16}$ in. The ideal depth was given as $2\frac{3}{4}$ in., with $\frac{1}{32}$ in. flare for each $\frac{1}{8}$ in. of depth; the spacing between pans was $\frac{7}{8}$ in.

Other subjects of special interest were mold and "holes in bread." L. W. Haas, W. E. Long Co., presented the research committee report on the latter, giving suggestions as to how best to overcome the difficulty.

The following officers were chosen at the convention: president, Carlos S. Pickering; vice-presidents, Edward M. Joy and C. A. McDuffee; secretary-treasurer, Victor E. Marx.

"U. S. STANDARDS for Tomatoes for Manufacture of Strained Tomato Products" giving a different set of grades for use at canneries that do not pack whole tomatoes have been issued by the Bureau of Agricultural Economics. Based upon some 60,000 inspections made at factories during 1932, the grades are as follows:

"U. S. No. 1 shall consist of tomatoes which are fairly firm, ripe, well colored and free from stems and from damage caused by badly discolored cracks, shriveling, molds, decay, sunburn, sunscald, freezing or other means.

"U. S. No. 2 shall consist of tomatoes which do not meet the requirements of the foregoing grade but which are ripe and fairly well colored and which are free from serious damage from any cause.

"Culls are tomatoes which do not meet the requirements of either of the foregoing grades."

COMPETITORS acting in concert may do anything that would not be considered in restraint of trade if effected by actual merger, according to an important decision handed down March 13 by the U. S. Supreme Court. This verdict was reached in connection with the now famous case of Appalachian Coals, Inc., which was tried under the Sherman Anti-Trust Act. The suit was brought to enjoin a combination of 137 producers of coal which had created an exclusive selling agency.

In his decision Chief Justice Hughes said: ". . . . there is no ground for holding defendants' plans illegal merely because they have not integrated their properties and have chosen to maintain their independent plants, seeking not to limit but rather to facilitate production. . . . "

SALMON caught in British Columbia waters must be landed fresh at a cannery within 24 hours after being caught, except fish gutted and iced immediately. This is the drastic regulation passed by the federal Department of Fisheries as an amendment to the Meat and Food Canning Act. Its application is made possible through the issuance of certificates by a board of inspection. If no certificate is issued, the canned salmon must be labeled "Second Quality."

This amendment has caused many small packing houses to assert that they are being discriminated against in favor of the larger companies who operate canneries on the fishing ground as well as at the larger ports. Independent fishermen also are protesting the change, maintaining it is a move to force them to unite with fleets of the larger canners.

REGULATION of Vitamin D in milk is under the jurisdiction of the state Department of Agriculture and Markets and not the city health board. This is the decision rendered by the Corporation Counsel of Buffalo, N. Y., in the case of Sparks Dairy, Inc., terminating the controversy between the board and the dairy. John J. Horan, president of Sparks Dairy, Inc., said the Department of Agriculture and Markets already had approved of the following wording on the bottle caps:

"Spark's grade A pasteurized milk with 150 vitamin D units added per quart. Produced by Zucker-Columbia University process."

CHARGES for selling and buying livestock on commission at National Stockyards, Ill., were unreasonable, Acting Secretary of Agriculture R. W. Dunlap proclaimed. To correct the situation, Mr. Dunlap issued an order establishing new rates effective March 20.

The rates for selling straight carloads of cattle were reduced from $15 and $18 minimum and maximum to $12 and $15.

—AND THE NEXT

MAY

8-10—Southern Bakers' Association, annual meeting, Hollywood Beach Hotel, Hollywood Beach, Fla. Thomas C. Hull, secretary, 191 Whitehall St., S.W., Atlanta, Ga.

9-11—American Wholesale Grocers' Association, annual meeting and exhibit, Peabody Hotel, Memphis, Tenn. R. H. Rowe, secretary, 900 Investment Bldg., Washington, D. C.

12—National Malt Products Manufacturers' Association, quarterly meeting, New York, N. Y. S. L. Goldman, secretary, 160 North La Salle St., Chicago, Ill.

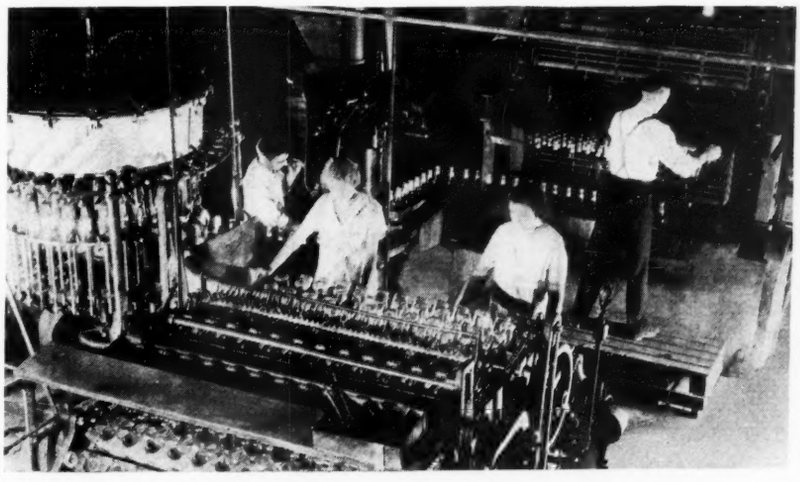
15-16—National Cottonseed Products Association, Roosevelt Hotel, New Orleans, La. S. M. Harmon, secretary, 1913 Sterick Bldg., Memphis, Tenn.

15-18—American Management Association, Palmer House, Chicago, Ill. K. B. Anderson, secretary, 20 Vesey St., New York, N. Y.

22-23—National Federated Flour Clubs, annual meeting, Gibson Hotel, Cincinnati, Ohio.

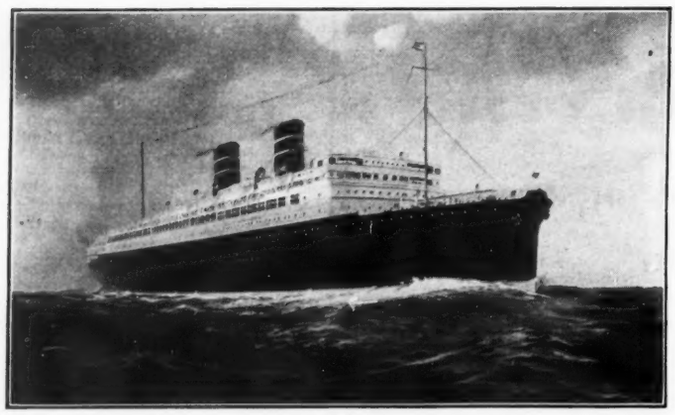
25-27—Rice Millers' Association, annual meeting, Galveston, Texas. W. M. Reid, secretary, 1101 Queen and Crescent Bldg., New Orleans, La.

—American Institute of Chemists, annual meeting. Howard S. Neiman, secretary, 233 Broadway, New York, N. Y.



Their Thirst Shall Be Quenched

In the large Blatz brewery at Milwaukee, as in every brew house in the country, bottling and crowning machines work at top speed so that no one shall want for beer after April 7.



Havana Bound

The palatial turbo-electric liner "Oriente" leaves New York April 22 for a week's cruise to Havana, carrying members of the bakers' associations of Pennsylvania, New York State and the Potomac states. The bakers certainly believe in mixing pleasure with business.

Those for a single deck of hogs, from $12 and $13 to $9 and $11; for single-deck cars of sheep, $9 and $13 to $9 and $11; and for double-deck cars, from $13 and $20 to $11 and $15. On account of the lower rates being charged by the two cooperative market agencies, reductions as applied to them were less.

Commissions paid by producers and shippers of livestock to the National Stockyards market in 1931 would have been less by approximately $165,000 under the new rates, it is estimated.

Criticizes Food Advertising

"Food advertising will either establish faith in itself through integrity or will destroy itself through lack of integrity." This statement was made by Raymond Hertwig, secretary of the committee on foods, American Medical Association, in a radio talk on March 7. Mr. Hertwig's speech conveys the impression that the advertising is doomed. He said in part:

"Does good advertising win your confidence, command your respect and faith when Florida orange advertising bursts forth with flaming claims that oranges prevent colds, prevent and cure influenza, prevent dyspepsia and ulcers; that oranges keep away rheumatic fevers and pains; when Hawaiian Pineapple Association advertising claims that canned Hawaiian pineapple helps you digest other foods and speeds digestion, particularly of protein of beans.

"Is your faith maintained by advertising claiming that 'yeast has a greater effect on the intestines than any other known food'; advertising that presents pictures of famous doctors of far-away countries with their professional testimonials that the best way to correct constipation is to eat fresh yeast?"

Three Evaporators Withdraw; C. P. McCormick to Resign

Disapproving of certain policies of the Evaporated Milk Association and being opposed to some recent advertising, three Eastern evaporators have withdrawn from the organization. The three include Borden Milk Products Co., Sheffield Condensed Milk Co. and Nestles Milk Products Co., all of New York, N. Y. Fifteen manufacturers remain in the association, Page Milk Co., Merrill, Wis., also having dropped its membership.

Another recent trade association development is the expression by C. P. McCormick, president of Mayonnaise Institute, of a desire to be relieved of the duties of his office. No action has been taken as yet, but his resignation most likely will be accepted. Frank Honicker continues as executive secretary.

Correction

Your list of carton filling and sealing machines can be made more complete by clipping out the following machine listing and pasting it on the bottom of page 96 of the March, 1933, issue of *Food Industries:*

Transit Tariffs Denied

Makers of hydrogenated semi-solid vegetable oil shortenings for the bakery trade have been rebuffed in their attempt to obtain mainufacturing-in-transit privileges from the railroads. In his report to the Interstate Commerce Commission the examiner recommends a finding that the transit tariffs of central and southern roads refer only to transit on vegetable oil converted into solid form for use in further manufacturing processes. This would exclude shipments from transit points of plastic products known as Delico, Vream, Bakerite, White Ribbon, Creamtex, Vanco and Snowflake.

▼

Concentrates

Fresh fish from the North Sea may be placed on American tables if a new process invented in Oslo proves successful. The fish are kept in a new type of refrigerating container which eliminates freezing, it is reported . . . Plans have been made by Nisshin Flour Mill Co., Japan, to increase the capacity of its Tsurumi plant from 8,000 to 12,000 bbl. daily. This plant produces flour for export . . . A German decree, effective March 11, increased the general import duty on eggs from 30 to 70 reichsmarks per 100 kilos and that on hard cheese from 30 to 60 reichsmarks . . . A German imitation of American tomato juice has appeared on the Reich market at prices considerably below those of the American product . . . A lemon the size of a grapefruit has been developed in California . . . Twenty-eight pills containing a ton of spinach were exhibited at the Packaging Show . . . Craig Packing Co., Waynesboro, Va., is packing baked apples in tin cans . . . More than 50 per cent of ginger ale is used as a mixer for alcoholic drinks, according to a statement by P. D. Saylor, Canada Dry's president . . . Where the confectionery manufacturer's gross margin is 25 per cent of sales, the average sale must exceed $4.65 to show a profit, according to a Commerce Department report . . . A coffee-doughnut restaurant has been established in Chicago by Ward Baking Co. and General Foods Corp. . . . Bills pending in legislatures of 13 states threaten to tax carbonated beverages . . . The opinion among wholesale grocers that their own representatives cannot promote and sell such beverages as ginger ale, has been shattered by Paxton & Gallagher Co., Omaha, which sold thousands of cases of its own P.&G. beverages within a few months.

Filling and Sea ing Machines

Manufacturer	Model	Type	Motor Size, H.P.	Packages Per Minute	Style Carton	Carton Size in Inches Minimum L. W. D	Carton Size in Inches Maximum L. W. D.	Time to Make Change
Stokes & Smith Co., Philadelphia, Pa.....	American.....	Automatic, gross weighter, net weighter, or volumetric. Hand feed, bottom and top sealer.....	1 or 2	30-40	Sea end	*3x1½x¾	11x7x4	30 min.
	Neverstop B, C, D, E and F..	Automatic, gross, weighter, net weighter, or volumetric. Hand or machine feed, bottom and top sealer	½-3	60-70	Seal end	†2¾x1⅝x¾	10½x6½x4½	.....

*Two sizes of machines for this range. †Five sizes of machines for this range. Not usually made adjustable.

PATENT DIGEST

Baking and Milling

Yeast Grown in Presence of Ethylene Chlorohydrin to Depress Zymatic Activity; Color, Odor, Taste and Reproducing Power Remain Normal—Alfred Schultz and Charles N. Frey to Standard Brands, Inc., New York, N. Y. No. 1,893,152. Jan. 3, 1933.

Malted Grain Produced in a Combination Soaking and Germinating Unit—Reinhold Kusserow, Oakland, Calif. No. 1,895,514. Jan. 31, 1933.

Wheat Germs Mashed in Large Quantity of Water in Absence of Oxygen at 55 to 65 Deg. C. for Extraction of Vitamins, Vitasterines and Fatty Ingredients—Ernst Komm, Dresden-Weisser Hirsch, Germany. No. 1,896,490. Feb. 7, 1933.

Wheat Germ Extracts Freed From Bitter Principles by Mashing in Atmosphere of Carbon Dioxide Gas and Subsequent Distillation by Steam—Ernst Komm, Dresden-Weisser Hirsch, Germany. No. 1,896,520. Feb. 7, 1933.

Cereals and Legumes Mashed in Large Quantities of Water in Presence of Diastatic Enzymes to Produce Extracts Rich in Vitasterines and Vitamins and Free From Bitter Principles—Ernst Komm, Dresden-Weisser Hirsch, Germany. No. 1,896,521. Feb. 7, 1933.

Method of Mashing Malt and Malt Mixtures—Philippe De Gaspe Beaubien, Outremont, Quebec; John F. Schneider, Montreal, Quebec; and François M. Du Pont, Chicago, Ill., to Canadian Research Corp., Ltd., Montreal, Quebec. No. 1,896,658. Feb. 7, 1933.

Cake Prepared From Flour Which Has Been Chlorinated to a Hydrogen-ion Concentration of Approximately 5.3 pH — Charles N. Frey, New York, N. Y., to Standard Brands, Inc., Dover, Del. No. 1,897,251. Feb. 14, 1933.

Beverages

Cereal Beverages of Low Alcoholic Content Prepared by Adding Hops to Original Wort and Using Top-Fermenting Yeast—Albrecht Haselbach, Namslau, Germany. No. 1,892,342. Dec. 27, 1932.

Cereal Beverages Stabilized by Treatment With Solution of Tannic Acid, Siliceous Clay and a Proteolytic Enzyme to Remove All Undesirable Albuminoids—Donato Cozzolino to Giulia Cozzolino, San Jacinto, Calif. No. 1,892,457. Dec. 27, 1932.

Self-Clarifying Coffee Product Prepared by Adding Less Than One-fortieth by Weight of Desiccated Egg Albumen to Coarsely Ground and Dry Roasted Coffee Beans—William J. Livingston to Livingston Coffee Co., Chicago, Ill. No. 1,897,393. Feb. 14, 1933.

Cereal Beverages Prepared by Using Yeast Which Will Not Ferment Maltose—Max Glaubitz, Berlin, and Hugo Haehn, Berlin-Frankenburg, Germany, to Versuchs- und Lehranstalt für Brauerei in Berlin, Germany. No. 1,898,047. Feb. 21, 1933.

Confectionery

Caramel Confections Spun and Rolled to Make Easier Eating — Robert Sollich, Rostock, Germany No. 1,890,533. Dec. 13, 1932.

Chocolate Liquor Treated With Papain and Pepsin in Presence of Acidulated Water to Aid in Fat Separation — Franz Peter Dengler to Lloyd M. Brown, Chicago, Ill. No. 1,892,449. Dec. 27, 1932.

Candy Centers Deposited Into Conditioned Starch Molds Formed on Endless Belt and Held Constantly at Temperatures Ranging Between 40 and 60 Deg. F. to Cause Quick Formation of Hardened Surface—Theodore and Charles Werner to John Werner & Sons, Inc., Rochester, N. Y. No. 1,894,651. Jan. 17, 1933.

Non-blooming Chocolate Coating Produced Through Addition of Not More Than 3½ Per Cent Finely Divided Gelatin and Not More Than 0.7 Per Cent Water to Chocolate Liquor—Lewis B. Esmond, Boston, Mass., and Werner W. Duecker, Pittsburgh, Pa., to Essex Gelatine Co., Boston, Mass. No. 1,894,677. Jan. 17, 1933.

Process for Preparing Chocolate—George Defren, Newton, Mass. No. 1,897,242. Feb. 14, 1933.

Dairy and Egg Products

Egg White Diluted With Water to Remove Insoluble or Unemulsifiable Materials Prior to Desiccation by Spray Method—Forest H. Clickner to Endowment Foundation, New Brunswick, N. J. No. 1,891,887. Dec. 20, 1932.

Pressed Casein Curd Divided Into Small Particles and Dried in Current of Air Having a Temperature Between 120 and 350 Deg. F.—Frank Lewis Chappell, Hobart, N. Y. No. 1,892,233. Dec. 27, 1932.

Honey-Butter Prepared by Mixing Partially Dehydrated Honey With Butter to Produce an Emulsion—David Rasky, Duluth, Minn., to International Honey-Butter Corp., Cleveland, Ohio. No. 1,892,902. Jan. 3, 1933.

Cultured Milk Produced by Treating Mixture of Skim Milk, Sweet Milk, Butter and Cream With a Kefir Fungi Culture at About 100 Deg. F. for Ten Hours—Samuel S. Lerner, Chicago, Ill. No. 1,894,377. Jan. 17, 1933.

Copies of Patents

Complete specifications of any United States patent may be obtained by remitting 10c. to the Commissioner of Patents, Washington, D. C.

Photostatic copies of foreign patents may be obtained at the same address, prices being forwarded on application.

Copies of patents should be ordered by number, as titles used in this digest seldom correspond with title of patent.

Whites of Eggs Emulsified With Peanut Oil, Casein and Water for Glazing Baking Products—Samuel Tranin and James T. Irwin, Jr., to Tranin Egg Products Co., Kansas City, Mo. No. 1,895,694. Jan. 31, 1933.

Soluble Casein Prepared by Treatment With Ammonia and Spray Drying—Albert F. O. Germann to S. M. A. Corporation, Cleveland, Ohio. No. 1,896,300. Feb. 7, 1933.

Fruits and Vegetables

Skin Removed From Soft Fruit by Immersion in Hot Bath Containing Alkaline Skin-Fiber Destroying Agent With Subsequent Treatment in Cold Water Bath and Washing Free From Skin in Jets of Cold Water—George Mayhew, Collingswood, Australia, to David Pickering Roderick, Endersby, Murrumbeena, Victoria, Australia. No. 1,895,102. Jan. 24, 1933.

Dry, Uncooked Sweet Corn Heated in Coconut Oil to Temperature of 400 Deg. F., Drained and Cooled to Cause Hardening of Oil on Surface of Corn—Hermon B. Laymon, Spencer, Ind. No. 1,895,166. Jan. 24, 1933.

Meat Packing

Meat Branding Ink for Use on Greasy or Moist Surfaces—Levi Scott Paddock to Swift & Co., Chicago, Ill. No. 1,895,641. Jan. 31, 1933.

Concentrates Prepared From Fresh Whole Liver by Treatment With Salt—John W. Dressel, Goldendale, Wash. No. 1,895,977. Jan. 31, 1933.

Starch and Sugar

Starch in Powder Form Converted Into Dextrin by Heat Treatment Under Controlled Conditions—Nathan Carleton Phillips to Russia Cement Co., Gloucester, Mass. No. 1,894,570. Jan. 17, 1933.

Raw Sugar Juice Acidified With Sulphur Dioxide to Increase Hydrogen-ion Concentration So That Insoluble Non-Sugars Can Be Separated Centrifugally From the Unheated Acidified Juice—John G. Foster, Paia, Hawaii. No. 1,897,424. Feb. 14, 1933.

Sugar Manufactured to Obtain a Refined Sugar and a Syrup Which Is Returned to the Process for Reconversion Into Raw Sugar—John J. Naugle, Rye, N. Y. No. 1,898,203. Feb. 21, 1933.

Electrolytic Purification of Starch-Converted Dextrose Solutions—Charles Ebert, Leonia, N. J.; William B. Newkirk, Riverside, Ill., and Meyer Moskowitz, Spring Valley, N. Y., to International Patent Development Co., Wilmington, Del. No. 1,889,779. Dec. 6, 1932.

Miscellaneous Products and Processes

Gelatin Sterilized and Puffed by Subjection to Temperature of Approximately 900 Deg. F. for 3½ Seconds—Edward Atherton, Warwick, England. No. 1,892,599. Dec. 27, 1932.

Canned Foods Frozen in Vertical Cylindrical Chamber Containing a Circulating Refrigerant Bath — Daniel G. Sorber, El Monte, Calif. No. 1,892,224. Dec. 27, 1932.

Pectin Extracted From Pectic Material by Heating in Acid Solutions Between the Limits of 60 and 110 Deg. C. With Subsequent Cooling—Philip B. Myers and George L. Baker, Newark, Del., to the people of the United States of America. No. 1,892,536. Dec. 27, 1932.

Vegetable Lecithin Purified by Treatment With Dibenzoyl Peroxide — Albert Schwieger to Hanseatische Muhlenwerke Aktiengesellschaft, Hamburg, Germany. No. 1,892,588. Dec. 27, 1932.

Cereals Conditioned and Dried by Passage Through Chamber Countercurrent to Flow of Heated Air—Ernst Roth, Niederuzwil, Switzerland, to Gebruder Buhler, Uzwil, Switzerland. No. 1,892,319. Dec. 27, 1932.

Vegetable Lecithin Treated With Hydrogen Peroxide During Refining Process—Hermann Bollmann and Albert Schwieger to Hanseatische Muhlenwerke Aktiengesellschaft, Hamburg, Germany. No. 1,893,393. Jan. 3, 1933.

Casein Gel Produced by Subjecting Casein to Elevated Temperatures in the Presence of Sodium Fluoride and Water; Gel Dissolves in Mild Alkali, Gives Thick, Viscous Solution—Francis Clarke Atwood, Newton, Mass. No. 1,893,608. Jan. 10, 1933.

Gluconic Acid Produced From Glucose Nutrient Solution by Fungi—James N. Currie, Jasper H. Kane and Alexander Findlay to Charles Pfizer & Co., Brooklyn, N. Y. No. 1,893,819. Jan. 10, 1933.

Method of Irradiating Protein Foodstuffs Without Developing Objectionable Flavor and Taste—Newcomb K. Chaney, Lakewood, Ohio, to National Carbon Co., New York, N. Y. No. 1,894,158. Jan. 10, 1933.

Food Quick-Frozen by Subjection to Chilled Air in Presence of Dense Fog—Mikail Trofim Zarotschenzeff, London, England, to American "Z" Corp., New York, N. Y. No. 1,894,813. Jan. 17, 1933.

Light Colored Mixtures of Vegetable Phosphatides and Fatty Oil Prepared From Crude Soya Lecithin Bearing Oil—Bruno Rewald, Hamburg, Germany. No. 1,895,424. Jan. 24, 1933.

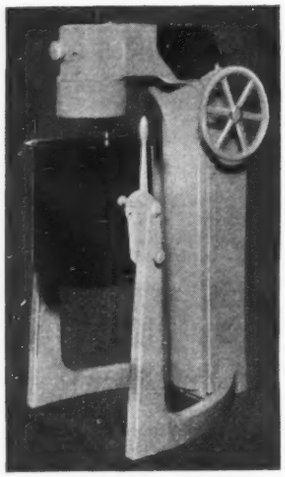
Gelatin Desserts Prepared in Compressed Tablet Form—Clarence C. Zeigler, Maplewood, N. J., to Swift & Co., Chicago, Ill. No. 1,896,049. Jan. 31, 1933.

Frozen Cakes of Fresh Food Products Protected by Complete Inclosure in Water Glaze Formed Directly on Surface of Cakes—Donald K. Tressler, Gloucester, Mass., and Karl B. Norton, Manchester, Mass., to Frosted Foods Co., Inc., Dover, Del. No. 1,896,529. Feb. 7, 1933.

Vitamin Concentrates Obtained From Fat Through Use of an Aluminum Salt—Walter G. Christiansen, Bloomfield, N. J.; William S. Jones, Brooklyn, N. Y., and Eugene Moness, New York, N. Y., to E. R. Squibb & Son, New York, N. Y. No. 1,897,039. Feb. 14, 1933.

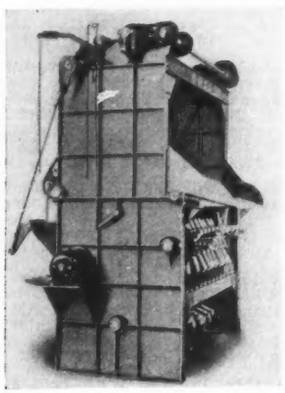
Soya Bean Flour Used as Base for Vegetable Protein Glue—William Dawes Fawthrop, Seattle, Wash. No. 1,897,469. Feb. 14, 1933.

NEW EQUIPMENT FOR



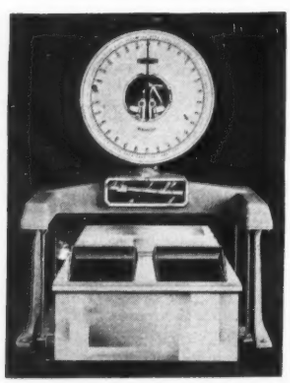
Glass-Lined Multimixer

Products which require creaming and beating, such as mayonnaise, marshmallow and mincemeat, may be handled by the Multimixer recently placed on the market by Pfaudler Co., Rochester, N. Y. The mixer includes an all-welded mixing tank made of open-hearth steel and lined with acid-resisting blue glass enamel. The tank is suspended from trunnions on a sturdy frame that also supports an epicyclic agitator drive, a driving motor, gears for lifting the agitator and a lever for tilting the tank. The mixer is designed for a 1,140-r.p.m. motor, and agitator speeds of 100, 200 or 350 r.p.m. are available. A steam-jacketed mixing tank is optional. The Multimixer is made in capacities of 10 and 20 gal. Different types of agitators are provided.



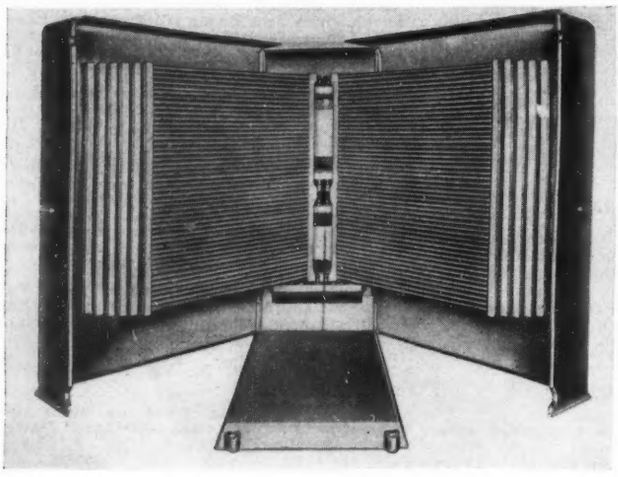
Medium-Size Compact Dehairer

To provide a dehairer of medium size that will handle up to 150 heavy hogs per hour, Cincinnati Butchers' Supply Corp., 1972 Central Ave., Cincinnati, Ohio, has developed its No. 120 two-shaft grate dehairer. The machine has two sets of flexible scrapers mounted on shafts driven by a roller chain. The charging cradle is operated through a manually controlled clutch, so that the number of hogs handled can be regulated in accordance with their size. The dehairer has a rigid cast-iron frame, is driven by a 12½-hp., splashproof, geared-head motor; requires a floor space of 6x11 ft., and weighs 12,700 lb.



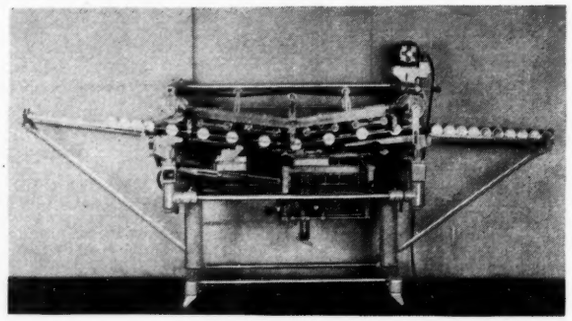
Self-Contained Weigh-Can Scales

Self-contained weigh-can scales distinctive in appearance and designed for accuracy and durability are announced by Kron Co., Bridgeport, Conn. The unit is built with either a pedestal or pipe-stem support. The dial mechanism is the double-pendulum ball-bearing type, and it employs only two draft bands. A non-vibrating sector arm precludes the possibility of pointer vibration, and an auxiliary sector eliminates backlash in the gearing. The dial chart can be furnished with a diameter of 24, 30 or 36 in. The dial housing is constructed so that it may be turned in any direction, is sealed and has a heating element inside. All parts of the scale are made of non-corrosive material, the pivots being of a low-friction alloy.



Cooler Swings Open For Cleaning

Easy access for cleaning is afforded in the fan cooler and heater made by Jensen Creamery Machinery Co., Inc., Bloomfield, N. J. The cooler opens "like a book," the wings swinging out 120 deg. The leaves (or individual sections of tubes) are mounted on hollow pivots through which the cooling medium (brine, water or liquid ammonia) passes from the crossheaders. Swivel leakage is checked by metallic-packed stuffing boxes, and leakage, if any, is carried away through drain pipes so that it cannot mingle with the milk. The unit construction of the cooler permits its capacity to be increased by the installation of additional leaves. The use of 1-in. tubes is held to provide high efficiency; and neat appearance, small floor space and low headroom are other attributes. The illustration shows the cooler open and with the bottom trough removed.



Slide Rule for Trucks

With a slide rule developed by Reo Motor Car Co., Lansing, Mich., rapid calculation may be made of the various factors of truck performance. It will compute load-pulling ability for various gear ratios, tire sizes and engine torque and will calculate speeds with similar combinations of tire sizes and gear ratios. All calculations may be made with one set-up. The rule is approximately 8x3 in. It is inexpensive.

Transparent Bag

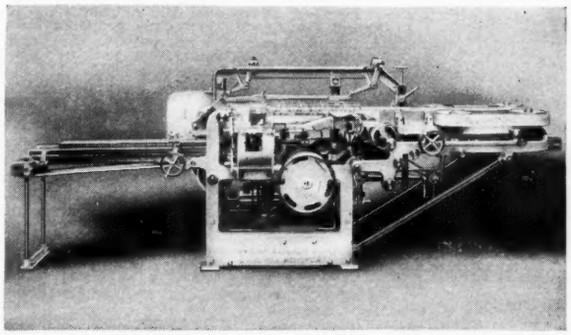
As an implement for promoting consumer good will, food manufacturers may be interested in a transparent cellulose bag developed by United States Envelope Co., Springfield, Mass., for keeping food fresh in the refrigerator, lunchbox, bread box and pantry. The maker asserts that food inclosed in this bag retains its moisture, flavor and odor and does not absorb the flavors or odors of other products near it.

Labeler Accommodates Many Can Sizes

Cans ranging in diameter from 3⅞ to 4¾ in. and in height from 2 to 5¾ in. are handled by the model MH labeling machine developed by New Way Canning Machines Co., Hanover, Pa. The machine may be changed to accommodate any of these sizes in less than 2 minutes, without the use of tools. Additional convenience is provided by centralized control. It is also considered important that no change is required in the label base and that the label bed does not have to be placed off center. The machine is reported to be economical, since it has speed higher than the average, uses minimum amount of pick-up gum and lap paste, and has the important rotating parts running in oil and on ball bearings.

Slit Sieves Of Rugged Design

Sieves made of wedge-shaped wires and having high carrying capacity and large open area are being marketed by Abbe Engineering Co., 50 Church St., New York, N. Y. The wires are looped at intervals and the loops are fastened together by bolts or crossbars. The space between wires can be widened by inserting washers between the loops. Since the slits have downward enlargement, clogging is minimized. And for screening splintery material, which has a tendency to clog, a step sieve has been developed. Any material caught in the slits is forced forward by the incoming charge and conducted through the open end of the slit at the first step. The wedge-wire, looped construction can be incorporated into cylindrical, cone-shaped, fan-shaped or other specially formed sieves. The same construction can be used also for flooring where rapid draining is needed. These slit sieves are manufactured in sizes up to 40 ft. long by 4 ft. 9 in. wide. They are made of Siemens Martin steel of 60 to 70 kilos tensile strength or of raw, galvanized or lead-coated brass, copper, bronze, phosphor bronze, nickel, Monel metal or aluminum.

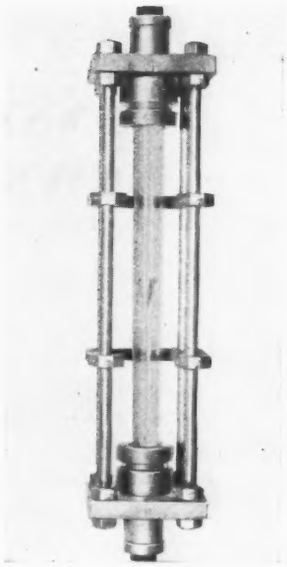


Fully Automatic Adjustable Wrapper

Flexibility which permits the wrapping of packages varying in length from 2½ to 12 in. is incorporated in the model F-9 adjustable automatic wrapping machine manufactured by Package Machinery Co., Springfield, Mass. The permissible variation in the width of the package is from 1¾ to 5¼ in., and in the height, from ⅜ to 4½ in. However, the machine will not handle the maximum or minimum in all three dimensions. Another advantage of the wrapper is that the sealing liquid is contained in a large reservoir and is pumped to points of application; glue and/or heat sealing attachments are available. Also, the machine is built without cams, with the exception of one. The wrapper is equipped with a roll feed and will handle transparent cellulose, glassine or waxed paper; electric-eye control may be had for printed rolls. A sheet feed may be had for printed paper wrappers. The machine wraps 75 to 85 packages per minute. It is driven by a 1-hp. motor and occupies a floor space of 4x12 ft., with conveyors.

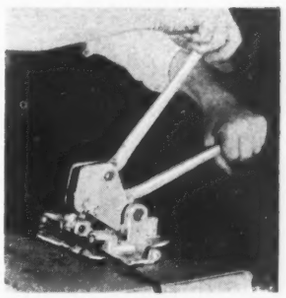
Rotating Float Indicates Flow Rate

Rates of flow of liquids and gases are indicated by the position of a top-shaped rotating float in the Rotameter developed by Schutte & Koerting Co., 12th and Thompson Sts., Philadelphia, Pa. The fluid being metered suspends the float in a vertical Pyrex glass, and slots in the head of the float cause it to rotate. Since the float remains in the center of the stream, the indicator is entirely frictionless. The transparent tube is tapered so that the area of the orifice through which the fluid passes increases as the rate of flow increases, giving straight-line calibration. Variations in the density and specific gravity of the fluid affect the reading, but the instrument is easily corrected for these factors, it is said. By virtue of an electrical transmission system, the Rotameter may be used as a recording and integrating flow meter and also as a flow controller.



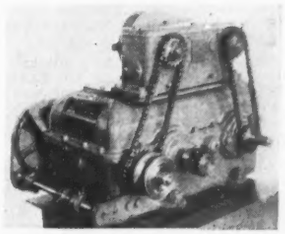
High-Speed Strapper

Stretching, sealing and cutting are all accomplished by a combination strapping tool developed by Acme Steel Co., 2840 Archer Ave., Chicago, Ill. This unit reduces strapping time by 50 per cent and more, the manufacturer asserts. The operator puts the seal into the mouth of the sealer and inserts the metal band into the tool. One stroke of the stretcher lever tightens the band and a single movement of a second lever applies the seal, seals it, and cuts the band from the coil. The tool retains the loose end of the band.



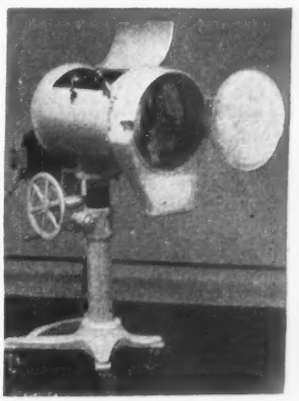
Specially Designed Speed-Control Unit

A total speed-reduction ratio of 1,840,000 has been attained in a specially designed, gear variable-speed transmission unit made by Link-Belt Co., 910 South Michigan Ave., Chicago, Ill. And this unit provides selective starting speed and a straight-line speed decrease that is selective between 1 and 18 per cent. Also, it effects automatic time cycle control with a time selection of between 1 and 24 hours. A selection chart enables the user to determine the ratio of change gears to employ with the special reducer unit for the necessary combination of speed, percentage of speed change and time.



Mixer, Aerater And Sifter

Any combination of dry ingredients, such as cake and doughnut preparations, may be mixed, aerated and sifted with a three-in-one machine developed by Tri-Une Machine Co., Hanover, Pa. This machine has mixing and sifting compartments separated by a divider. When mixing is completed, passageways through the divider are opened to permit the ingredients to flow into the sifting compartment. These openings may be varied to regulate the rate of flow and hence the speed of sifting. In the sifting compartment, the mixture is worked through a 24-mesh screen by three brushes mounted on radial arms attached to a shaft that also drives the mixing agitators. The agitators are mounted on radial arms and they are edged with brushes and set at an angle so that they automatically empty and clean the mixing compartment. The machine is either mounted on a telescoping pedestal or suspended from a monorail. It is driven by a ½-hp. motor; the unit illustrated has a capacity of 50 lb.



THE MANUFACTURERS OFFER

Packaging — In a 16-page booklet, "Truth About Modern Food Packaging," Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., publishes charts to show the rate of moisture loss from foods when they are wrapped in waxed paper as compared to their loss when they are not wrapped.

Packers' Equipment—Several processing units developed for meat packers during 1932 by Cincinnati Butchers' Supply Corp., 1972 Central Ave., Cincinnati, Ohio, are described and illustrated in a 16-page bulletin, No. 21.

Marketing — "Overhauling Your Order-Getting Machine" is the title of an 18-page, pocket-size booklet prepared by Spooner & Kriegel, 507 Fifth Ave., New York, N. Y., to describe the manner in which industrial concerns should go about increasing their business and to discuss advantages of employing sales consultants.

Colloid Mill — The second printing of a 16-page bulletin describing the colloid mill manufactured by Premier Mill Corp., Geneva, N. Y., is now available. The publication presents the features of construction and industrial applications of the machine.

Books—In a 246-page catalog, McGraw-Hill Book Co., Inc., 330 West 42d St., New York, N. Y., gives synopses of its publications and lists their contents, number of pages, size, type of cover, number of illustrations and price. The books described cover 175 different fields, principally in engineering, business and science. Some 50 of these fields are of interest to food manufacturers. Indexes by subject and by author make the catalog easy to use.

Control Instruments—In a 32-page, effectively illustrated bulletin, No. 175, Foxboro Co., Foxboro, Mass., explains the theory and describes the operation of its Stabilog system of automatic control. The publication deals at length with automatic control, comparing the various types of control systems. Separate sections cover the application of the Foxboro system to control of temperature, pressure, liquid level and flow.

Canned-Fruit Specifications—Specifications for California canned fruits as adopted by Canners' League of California and approved by Southern California Canners' Association are presented in a 30-page, pocket-size booklet, published by Canners' League of California, San Francisco, Calif. The fifth edition is now off the press.

Dairy Advertisements — A series of ten newspaper advertisements for dairies, featuring the Darco Sanitary Metal Milk Cap, have been published in folder form by Crown Cork & Seal Co., Baltimore, Md. The company has also issued a 32-page, pocket-size, illustrated booklet describing the Darco Disk and the machinery for applying it.

Milk Bread — "Whole Milk Bread" is the title of a 10-page, pocket-size booklet issued by Dry Milk Co., Inc., 205 East 42d St., New York, N. Y., to describe the opportunities afforded bakers by this product and to present formulas and government standards. A 40-page booklet by the company deals with the development of milk for baking, its value in the bakery, and its use in baking bread. It describes methods and formulas said to have proved effective in practice.

CONSTRUCTION NEWS

	Proposed Construction Pending	Contracts Awarded — Cumulative 1933 — Awarded March	No. Awards	Total
Bakery Products	28,000	$42,000	1	$128,000
Beverage	315,000	128,000	5	498,000
Canning and Preversing	146,000	28,000	1	143,000
Confectionery	.....	.....	..	.....
Grain Mill Products	603,000	290,000	4	419,000
Ice, Manufactured	163,000	60,000	1	256,000
Meats and Meat Products	125,000	28,000	1	108,000
Milk Products	396,000	141,000	5	329,000
Sugar	750,000	.....	..	.....
Miscellaneous	107,000	30,000	1	288,000
Total	$2,633,000	$747,000	19	$2,169,000

PROPOSED WORK BIDS ASKED

Bakery—Sunnyvale Bakery, 215 Murphy St., Sunnyvale, Calif., is receiving bids for 1 story, 25x125 ft. bakery.

Brewery—American Brewing Co., Great Falls, Mont., plans alterations to brewery and installing equipment. Estimated cost $50,000.

Brewery—Eagle Brewing Co., 315 3rd Ave., Utica, N. Y., plans to alter and equip brewery. Owner now taking bids on various construction work and equipment. Estimated cost to exceed $40,000.

Brewery—Gulf Brewing Co., Utica, N. Y., plans to alter and equip brewery. Estimated cost $75,000.

Brewery—New Amsterdam Brewery Co., Rochester, N. Y. and 10 East 40th St., New York, is having plans prepared by Badgeley & Wood, 101 Park Ave., New York, for construction of a brewery, 125,000 bbls. capacity per year. Estimated cost $150,000.

Creamery—Blue Valley Creamery Co., 234 Market Ave. S.W., Grand Rapids, Mich., contemplates the construction of an addition to its creamery. $28,000.

Creamery—F. B. Handy, Greencastle, Ind., is having plans prepared for creamery. $40,000.

Creamery — Harmonsburg Creamery Co., Harmonsburg, Pa., plans construction of a plant at Fort Wayne, Ind. Estimated cost to exceed $28,500.

Dairy—Beyer Creamery, Ft. Collins, Colo., is having preliminary plans prepared for rebuilding dairy recently destroyed by fire. $28,000.

Milk Plant—Duval County Butter Milk Co-Operative League, V. Johnson, pres., Jacksonville, Fla., contemplates the construction of a milk plant. $25,000.

Dairy Plant—Copper State Creamery Co., C. Heglund, in charge, Phoenix, Ariz., plans rebuilding dairy plant at Phoenix, Ariz. Estimated cost is $75,000.

Dairy Building — Grand Rapids Milk Producers Assn., Grand Rapids, Mich., plans constructing new dariy building at Grand Rapids, Mich. Estimated cost is about $28,000 with equipment.

Dairy—Milk Producers Marketing Co., L. D. Jaccard, pres., Bethel, Kan., will soon receive bids for 1 story, 40x123 ft. and 42x85 ft. addition to dairy at 1615 Minnesota Ave., Kansas City, Kan. Swanson & Besecke, 1217 Orville St., Kansas City, Kan., are architects.

Dairy and Cheese Factory—Union Milk Producers Assn., Sugar Creek, O., contemplates the construction of a dairy and cheese factory. $28,000.

Cheese Plant — L. Calderoni, Livermore, Calif., represented at Tracy, Calif., by C. E. Ritter, plans construction of a cheese plant, 15,000 lb. daily capacity, at Tracy, Calif.

Swiss Cheese Plant — Ernest Rolli, Galena, Ill., plans construction of a Swiss cheese plant, at Olney, Ill. Estimated cost is about $28,500 with equipment.

Storage and Distribution—Wrightwood Dairy Co., J. Sawa in charge, Wrightwood Ave., plans constructing storage and distribution plant, Wellington and Western Aves., Chicago, Ill. Estimated cost is $30,000 with equipment.

Tomato Processing Plant—L. Caprino, 2656 Van Ness Ave., San Francisco, Calif., plans constructing a tomato processing plant at Visalia, Calif.

Canning Plant—Farmers Supply Co., E. Mace Smith in charge, Princess Anne, Md., plans the construction of a vegetable canning plant here. $28,000.

Packing Plant — Goldkist Packing Co., Church and East Ave., Fresno, Calif., plans rebuilding packing plant at Fresno, Calif., destroyed by fire. Estimated fire loss is $50,000.

Cannery — Producers Co-Operative Packing Co., 1695 Commercial St., Salem, Ore., soon takes bids for construction of cannery, at Salem, Ore. Estimated cost with equipment is $40,000.

Feed Mill—Arizona Feed & Seed Association, Phoenix, Ariz., M. Humphries, manager, plans construction of a feed mill at Phoenix, Ariz. Estimated cost is $20,000.

Grain Elevator—V. V. Current, State Line, Ind. (Warren Co.), is having plans prepared for a grain elevator. $40,000.

Warehouse—City of Toledo, O., plans construction of a grain elevator and warehouse, about 25,000,000 bu. capacity. Application for Reconstruction Finance Corp. loan. Estimated cost is $450,000.

Milling Plant—I. Sheinbert Milling Co., c/o S. Sheinbert, 9022 Parkgate Ave., Cleveland, O., contemplates the construction of a milling plant at 2290 West 3rd St., Cleveland. $30,000.

Grain Warehouse—Watertown Elevator Co., North Water St., Watertown, Wis., plans constructing addition to building used as warehouse, North Water and Rock Sts., Watertown, Wis.

Flour Mill—Wembly Flour Mills Co., Wembly, Alta., Can., plans the construction of a flour mill and will be in the market for machinery. $35,000.

Ice Plant—Home Ice Co., Gainesville, Tex., has purchased a site on North Commerce St. and plans the construction of an ice plant.

Ice Manufacturing—Pure Ice Co., 524 20th St., Huntington, W. Va., plans construction of ice manufacturing plant at Huntington, W. Va. Estimated cost is $75,000.

Ice Plant—G. G. Redwine, 1837 Merced St., Fresno, Calif., is having plans prepared for the construction of an ice manufacturing plant at Hanford, Calif. $60,000.

Stock Yards—Chamber of Commerce, c/o W. J. Holden, Civic Bldg., Tulsa, Okla., plans constructing stock yards at Tulsa. Estimated cost is $50,000.

Meat Packing Plant—John W. Reichert, c/o Harry L. Meacham Associates, architects, 120 Front St., Worcester, Mass., plans construction of 2 story, 75x180 ft., meat packing plant, Lundberg and Beck Sts., Worcester. Estimated cost is about $75,000.

Fruit Storage and Distribution, etc.—Syracuse Fruit Co., 200 West Bedlin Ave., Syracuse, N. Y., plans altering and repairing storage, distribution and office building, at 200 West Bedlin Ave., Syracuse, N. Y. Estimated cost is $45,000. Engineer and architect not appointed.

Packing Plant—B. H. Kroger Co., Indianapolis, Ind., is having plans prepared by Tietig & Lee, archts., 34 West 6th St., Cincinnati, O., for altering and enlarging packing plant at 1220 Dover St., Indianapolis, Ind. $62,000.

Sugar Beet Refinery—Syndicate, headed by O. C. Feetham, 54 Rosslyn Apartments, Winnipeg, Manitoba, plans construction of a sugar beet refinery, at Winnipeg, Manitoba. Estimated cost is $750,000.

CONTRACTS AWARDED

Bakery—Ancona Baking Co., St. Mary and Constance Sts., New Orleans, La., awarded contract for 1 and 2 story, 130x130 ft. bakery to Alvin M. Fronherz, Q & C Bldg., New Orleans, La. $41,650.

Brewery—Fort Pitt Brewing Co., Sharpsburg, Pa., awarded contract for construction of a 2 story, 29x88 ft. brick, steel, concrete brewery addition, Sharpsburg, Pa., to Martin Nettrour Co., Diamond Bank Bldg., Pittsburgh, Pa. Estimated cost is $20,000. F. F. Bollinger, Ambridge, Pa., is engineer.

Brewery—Manitowoc Products Co., 9th and Marshall Sts., Manitowoc, Wis., awarded contract for remodeling and constructing 2 story, basement, 58x78 ft. addition to brewery, to Kasper Constr. Co., 4 North 8th St., Manitowoc. Estimated cost $25,000.

Brewery—W. Voss, North Main St., Salinas, Calif., awarded contract reconstructing brewery to W. E. Greene, 27 Lincoln Ave., Salinas. Estimated cost exclusive of equipment $25,000.

Brewery—Northwest Brewing Co., Tacoma, Wash., awarded contract for construction of a brewing plant, at 4th and Elliott Sts., Seattle, Wash., to R. M. Grant, J. Vane Bldg., Tacoma, Wash.

Brewery—West End Brewing Co., Utica, N. Y., will alter and equip brewery by day labor and separate contracts. Estimated cost $30,000 or more.

Creamery—Dairy Products Co., Ltd., San Pablo and Delaware Aves., Berkeley, Calif., will build a creamery. Work will be done by separate contracts. Estimated cost to exceed $28,000.

Pasteurizing and Bottling Plant — Herold Dairy, Butler, Pa., plans alterations to pasteurizing and bottling plant at Butler, Pa., work by separate contracts. Estimated cost is about $28,500.

Ice Cream Factory—C. Mamos, Penacook Rd., Concord, N. H., awarded contract for 2 story, 30x50 ft. ice cream factory to C. R. Morey, 13 Pierce St., Concord.

Milk House, etc.—Schwartz Milk Co., 8022 Caldwell Ave., Maspeth, N. Y., plans construction of 1 story, 27x82 ft., milk house and cold storage at Maspeth, N. Y. Work will be done by separate contracts. M. Perlstein, Middle Village, architect.

Factory Extension—Towers Ice Cream Co., M. J. Pfeiffer, secy., Scholes and Humboldt Sts., Brooklyn, N. Y., constructing extension to plant at Scholes and Humboldt Sts., Brooklyn, N. Y., by separate contracts.

Canning Plant—Kings Creek Canning Co., lessee, Princess Anne, Md., plans to establish a tomoto canning plant here. Work will be done by separate contracts. $28,000.

Packing Plant—California Almond Growers' Exchange, 1809 C St., Sacramento, Calif., awarded contract for packing plant to H. W. Robertson, 3004 F St., Sacramento. $30,000.

Grain Elevator—Consolidated Elevator & Milling Co., Fred Burns, mgr., Wichita, Kan., awarded contract for two reinforced-concrete storage tanks, 60,000 bus. capacity, and headhouse at grain elevator at Winfield, Kan., to Chalmers & Borton, Pioneer Trust Bldg., Kansas City, Mo. $15,000.

Grain Elevator—General Mills Co., Minneapolis, Minn., awarded contract for 500,000 bu. capacity addition to grain elevator at Amarillo, Tex., to Jones-Hettelsater Construction Co., 600 Mutual Bldg., Kansas City, Mo.

Grist Mill—Nowak Milling Corp., Hammond, Ind., awarded contract for new mill to F. C. Rowley, 5231 Hohmann St., Hammond. $100,000.

Feed Mill Plant—Sherman White Co., Fort Wayne, Ind., awarded contract for construction of feed mill, etc., at Fort Wayne, Ind., to Gumper & Son, Fort Wayne, Ind. Estimated cost is $75,000.

Ice Plant—Ice Service Corp., Neptune City, N. J., awarded contract for ice plant to Wigton-Abbott Corp., 143 Liberty St., New York, N. Y. $60,000.

Storage Building—Swift & Co., Union Stockyards, Chicago, Ill., awarded contract for 1 story, 60x60 ft. storage building to I. Singer, 429 Bacon Ave., Akron, O. Estimated cost to exceed $28,000 with equipment.